FRONTIER™ PRECISION

Sentinel® GIS

Installation Guide

Revision 23 - 10/6/2017

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complete and exclusive statement of the agreement between you and Frontier Precision regarding the software.

Questions?

Should you have any questions concerning this Agreement, please call Frontier Precision at (208) 324-8006.

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Introduction

About Sentinel GIS

Sentinel GIS is your complete solution for recording and managing data critical to controlling mosquitoes. This easy-to-use package features mobile GIS solutions for mosquito control, automated synchronization between the desktop GIS and the mobile GIS, and supervisory tools making it easy for supervisors to customize and maintain their workflow processes. Applications are based on industry standard Esri ArcGIS and ArcPad software yet are configurable for your operation.

Sentinel GIS offers four application modules. Pick and choose the modules that fit your mosquito control needs. Modules can be added onto the package when you are ready to implement new control methods.

Sentinel GIS Modules

Larviciding

To control mosquito populations, field inspectors first locate standing water bodies that serve as mosquito breeding grounds and apply control agents if mosquito larvae or pupae are present. Field inspectors prepare for field work by synchronizing their handheld device with a desktop computer using DataLink GIS. In the field, they navigate to the water bodies needing inspection. Once at the site, the crew maps the site with GPS, records an inspection, or views a past inspection. Inspectors can record the application of multiple biological agents along and view past treatment history. Sentinel GIS helps manage the inspection schedule on a per-site basis.

Adulticiding

In Adulticiding, fog-spraying is used to kill adult mosquitoes. The Adulticiding application manages fogging activities to efficiently schedule personnel and equipment while minimizing chemical usage and costs. Supervisors prepare for fogging activities by downloading user-specific application settings, accompanying maps, and GIS layers into their handheld device. In the field, the fogging operator logs in to the application, which then records spray activities, including location, time, chemical type and amount. Fogging areas can be viewed on a map. Back at the office, supervisors automatically transfer, merge, and update the GIS. ArcGIS provides desktop tools for map display and query including the creation of fog areas. Supervisor tools are available for managing personnel, equipment, fogger calibration, and chemicals used. Pre-defined report templates quickly generate required spray activity reports.

Surveillance

Collecting data on adult mosquitoes and other disease vectors such as dead birds and sentinel chickens facilitates the formulation of an effective control plan. Surveillance methods include:

1. Monitoring mosquito population distribution and abundance over time via traps and landing counts
2. Testing trapped mosquitoes for diseases affecting human or animals
3. Testing sentinel chickens or dead wild birds for diseases

Using Sentinel GIS Surveillance, supervisors prepare for field activities by downloading GIS data for trap locations, mosquito species, sentinel chicken flock information, data collection forms, and maps into the handheld device. In the field, the technician navigates to or maps trap sites, records trap site surveys, conducts sentinel chicken or dead wild bird surveys, and records landing count rates. This information is automatically transferred into the GIS back at the office. ArcGIS provides desktop GIS tools for map display and query. Supervisor tools enable management of trap information, laboratory surveys, mosquito species, sentinel chicken flock and dead bird details, and laboratory test results. Predefined templates quickly generate a wide variety of map layers and reports for analysis, including mosquito abundance, disease details, and mosquito disease distribution.

Service Request

The Service Request module includes a web-based and desktop application for creating, tracking and reporting incoming service requests about mosquito or other customer service activity. Information logged includes location, complaints about biting or swarming mosquitoes, or requests for mosquito control. Analyzing this information, the agency can identify the problem sources, apply treatments efficiently and reduce the amount of pesticide used. Supervisors prepare for field activities by downloading service request locations, assigned requests, and accompanying maps into the handheld device. In the field, the inspector maps the service request location, and updates service request details. Back at the office, field data are merged into ArcGIS. Supervisor tools are available to prioritize service requests, establish work zones, and identify trends and problem areas. Predefined report templates summarize service requests over a specified time period.

System Components

Rugged Handheld Device With GPS

Any handheld device running the Windows Mobile 6.x operating system that is compatible with ESRI ArcPad 10.0.4, 10.2.2, 10.2.3, or 10.2.4 software can be supported[1]. For the Adulticiding module, hardware devices must have a 9-pin COM port that can connect to the sprayer control box, and built-in GPS.

Other devices can be used with Sentinel software, as long as they are sent in to Frontier Precision for testing and approval prior to intended use.

Rugged Windows Device With GPS

DataLink GIS 4 supports Windows devices through the Memory Card Device. Any portable Windows device that is compatible with Esri ArcPad 10.0.4, 10.2.2, 10.2.3, or 10.2.4 software can be supported[2]. The device must support some form of removable memory media (SD, micro-SD, USB), and if used with

[1] Frontier Precision maintains a list of "Approved Devices" (Tier 1 Preferred and Tier 2 Supported). These devices have been fully tested with Sentinel GIS. Other devices would have to be sent to Frontier Precision for complete testing before approving their use.

[2] Juniper Mesa 2, MobileDemand T7200 and T1400 have been fully tested. Other devices would have to be sent to Frontier Precision for complete testing before approving their use.

Adulticiding must have a 9-pin serial connection. It should also have internal GPS. The Juniper Mesa 2 has a USB port, a micro-SD card slot, internal GPS, and a 9-pin serial port. The MobileDemand tablets have an SD card slot or USB connection, internal GPS, and a 9-pin serial port.

Other devices can be used with Sentinel software, as long as they are sent in to Frontier Precision for testing and approval prior to intended use.

Mobile Software

All required mobile software is installed on your mobile device prior to shipment from Frontier Precision, provided it was purchased with Sentinel GIS software. If you intend to use Sentinel GIS software with handhelds you already own, you can ship them to Frontier Preicision for configuration if you prefer. Contact us at (208) 324-8006 or via email at chad@frontierprecision.com to make arrangements.

A license of **ESRI ArcPad 10.0.4, 10.2.2, 10.2.3, or 10.2.4** software is required for each mobile device. *Previous versions of ArcPad are not supported.* If you already own ArcPad licenses, current versions are obtained by purchasing maintenance or upgrades from ESRI. Please contact Frontier Precision for pricing and information on ArcPad licenses. Please contact ESRI Sales for pricing and information on ArcPad software maintenance or upgrade.

Sentinel GIS ArcPad applet files are placed on the desktop PC by the Sentinel GIS module installers, and are installed to each mobile device using DataLink GIS software. Instructions for deploying Sentinel GIS applications, maps, and data are contained in the respective *Sentinel GIS Quick Start Guide* for each module.

Windows Mobile 5 devices require **Microsoft .NET Compact Framework 3.5** to be installed in order for Sentinel applications to run correctly. This component is available from Microsoft. Simply search Microsoft's Website for '.NET Compact Framework 3.5 Redistributable' or paste the following link directly into your browser:

http://www.microsoft.com/en-us/download/details.aspx?id=65

Windows Mobile 6.x and Windows Embedded 6.x and 7.x devices do not require this component to be installed because it is included in the operating system.

Windows Mobile devices require **Microsoft SQL Server Compact for Windows Mobile** (deployed from the ArcPad Deployment Manager) for the Larviciding Storm Drain applet, which uses ArcPad AXF files instead of shapefiles.

Windows Embedded Handheld 6.5 devices require **VBScript Runtime Library for Windows Mobile** (deployed from the ArcPad Deployment Manager).

Desktop Software

A license of **ESRI ArcGIS Desktop 10.2.x, 10.3.x, 10.4.x, or 10.5 Basic (ArcView)** software is required for each desktop PC where Sentinel GIS will be used for data entry, editing, supervisory configuration, or

automated database synchronization/merge using DataLink GIS' Merge program. Esri **SDE geodatabase storage requires a Standard or Advanced license** (formerly ArcEditor or ArcINFO – Basic/ArcView is not capable of creating or administering SDE databases). *Previous versions of ArcGIS are not supported*. If you already own ArcGIS licenses, current versions are obtained by purchasing maintenance from ESRI. Please contact Frontier Precision for information and pricing on ArcGIS for Desktop Basic. Please contact your local Esri office for pricing and information on ArcGIS software maintenance, or ArcGIS for Desktop Standard or Advanced.

Sentinel GIS ArcMap toolbars are installed by the respective Sentinel GIS module installers. They require the Visual Studio 2008 Crystal Report Redistributable to be installed as a prerequisite.

DataLink GIS software is installed on any desktop or laptop that will be used as a 'download station' to connect and synchronize mobile devices. DataLink GIS requires Microsoft .NET Framework 3.5 or greater, and Microsoft Windows Mobile Device Center.

Windows Mobile Device Center is required to facilitate connection with handheld devices. WMDC can be downloaded from Microsoft's Website. Simply search for 'Windows Mobile Device Center' or copy one of the following links directly into your Web browser:

Mobile Device Center 6.1 32-bit: http://www.microsoft.com/en-us/download/details.aspx?id=14

Mobile Device Center 6.1 64-bit: http://www.microsoft.com/en-us/download/details.aspx?id=3182

Please note: Microsoft's download center says that Windows Mobile Device Center is for Windows Vista, but it also applies to Windows 7/8/10.

Microsoft .NET Framework 3.5 or greater must be installed. Please note that Windows 7 includes .NET Framework 3.5. Windows 8 and Windows 10 include newer versions of the .NET Framework; v3.5 must be turned on / enabled in Windows Features.

Sentinel GIS: Service Request Web requires **Microsoft Internet Information Services (IIS)** to be installed and configured for ASP .NET on the computer that will be used as an Intranet application Web server. **SAP Crystal Reports Runtime 13 SP 16 (32-bit) for Visual Studio** is required for reporting. If installing on Windows Server 2008 R2 or Windows 7/8/10, the **IIS 6 Metabase Compatibility** feature must be enabled. If 'SQL Server Express' is chosen as the data source during installation, **SQL Server 2008/2012/2014 Express Edition** and **SQL Server Management Studio Express** will need to be installed to configure and administer the Service Request database. More details can be found in the *Installation and Configuration* section of this guide.

Finding Additional Information

Help and User Guides

Sentinel GIS help is available in the Quick Start Guide (Program Files\Elecdata\Mosquito\ModuleName\ in PDF format) and in the Quick Reference Guide. The Quick Start Guide provides operating instructions

for the Sentinel GIS ArcMap toolbars, including setup and configuration, map queries and data generation, and report generation. It also includes instructions for DataLink GIS configuration and operation. Instructions for handheld software operation are also provided.

Current documentation and Support Notes are available at http://store.elecdata.com/field_data_collection/sentinel_gis.aspx.

ArcGIS Desktop Help is available through the Help menu in ArcMap. Esri's online resource center for ArcGIS can be accessed here: http://resources.Esri.com/arcgisdesktop/.

ArcPad help is available in the ArcPad User Guide (Program Files\ArcPad x.x\Help\), but it applies to the standard ArcPad interface. Esri's online resources for ArcPad can be accessed here: http://support.Esri.com/index.cfm?fa=software.filteredGateway&PID=26.

Online self-help resources for handheld devices, including documentation, operating system or firmware updates, support notes and bulletins, white papers, and FAQ's, can be accessed on each manufacturer's Website. For Trimble handheld devices, go to www.trimble.com/support and click the link for your model. For Juniper Systems handheld devices, go to www.junipersys.com/support and click the link for your model.

Training

Sentinel GIS training is available from Frontier Precision. Remote assistance, including product orientation and informal task-oriented training, is included in technical assistance. Formal instructor-led on-site training is also available in 1-, 2-, or 3-day formats. For information and pricing, please contact Frontier Precision at (208) 324-8006 or chad@frontierprecision.com.

ArcPad GPS Training (including Trimble Certified Mobile GIS Training) is also available from Frontier Precision. ArcPad training can be provided for any handheld device with any GPS receiver. Trimble Certified training can be provided for ArcPad with Positions with any Trimble GPS hardware. If you would like to use standard ArcPad for other data collection projects, please contact us for a training schedule or for on-site training options.

ESRI Virtual Campus and instructor-led training is available for ArcGIS Desktop, ArcGIS Server, and multi-user geodatabase (SDE). See http://training.Esri.com for help deciding which courses best suit your needs or the needs of your users.

Technical Assistance

Sentinel Support

High-priority unlimited toll-free phone and email support with extended hours is available from Frontier Precision for $295 per handheld per year ($195 to renew). If you have purchased Equipment Bundle Support with your mobile devices, please use the contact information below to contact support. This technical support covers the Trimble GPS hardware, Trimble or Juniper Systems' mobile devices, ArcPad

software, DataLink GIS, and Sentinel GIS modules for ArcPad and ArcGIS. Other GPS or mobile hardware may also be covered by support; please check with us to find out.

To contact Technical Support:

Frontier Precision
(208) 324-8006, 8 AM – 5 PM MTN
mapping_support@frontierprecision.com

When contacting support, please supply your contact details (name, company, email, phone) and a description of your problem or question.

Please note that high-priority technical support does not include software maintenance for ArcPad, ArcGIS Desktop, or hardware warranty for Trimble GPS equipment or Juniper Systems hardware. ESRI ArcGIS Desktop and ArcPad software have Support and Maintenance extensions available separately from ESRI; see www.Esri.com/support for more details. Trimble GPS equipment comes with 1 year hardware warranty standard, which can be extended two additional years. Please contact Frontier Precision for technical support renewal or hardware warranty extension, and ESRI for ArcGIS or ArcPad software maintenance.

If you have not purchased bundled support, limited technical support is still available Frontier Precision. 90 days technical support is included at no cost. The 90-day support period begins the first time technical support is requested after equipment and software have been received. After the 90-day support period, technical support is available on a pay-as-you-go basis, for $49.95 per support case, or by purchasing hardware bundle support. Please note that you will not be charged a support case for hardware warranty or repair issues.

Handheld and GPS Support

Technical support for your handheld and GPS receiver is obtained through Frontier Precision. Self-help resources are also available from manufacturer Websites. These include Frequently Asked Questions (FAQ's), Support Notes, documentation, and operating system and firmware updates.

Trimble makes support resources available by product type at www.trimble.com/support. For example, click on 'Trimble Nomad G' then click 'Support Notes' to view information relevant to your handheld.

Juniper Systems also makes support resources available by product type at http://www.junipersys.com/support/support.cfm. For example, click on Archer 2 Field PC Downloads to locate Operating System updates.

For hardware repair (warranty service or user damage), please contact Frontier Precision, or the device manufacturer.

Esri Software Support

ArcGIS Desktop and ArcPad software support as it relates to the use of Sentinel GIS is obtained through Frontier Precision. Technical assistance for issues, bugs, or defects with standard ArcGIS or ArcPad software is obtained through Esri Support. Technical assistance is included in annual Esri software maintenance. Even if maintenance is not current, self-help resources are also available from Esri's Website.

Live Support from Esri:

(888)377-4575 toll-free
Online request: http://support.Esri.com

Self-help resources, including patches and service packs, user discussion forums, documentation, support notes and white papers:

www.Esri.com/support
http://resources.Esri.com

Software Installation

System Requirements

Office Computer Specifications

Minimum computer specifications are based on requirements for ArcGIS Desktop software, available here: http://desktop.arcgis.com/en/system-requirements/latest/arcgis-desktop-system-requirements.htm. Not all operating systems supported by ArcGIS Desktop are supported by Sentinel GIS (see footnote below).

Platform: x86 or x64 with SSE2 extensions
Operating System: Windows 7 Ultimate, Professional, or Enterprise (32-bit or 64-bit)[3], Windows 10 Pro and Enterprise (32-bit and 64-bit), Windows Server 2016 Standard and Datacenter[4], Windows Server 2012 R2 Standard and Datacenter[5], Windows Server 2008 R2 32-bit or 64-bit[6]
RAM: 4 GB minimum, 8 GB recommended
Processor: 2.2 GHz minimum; Hyper-threading (HHT) or Multi-core recommended
Video/Graphics adapter: 64 MB RAM minimum; 256 MB RAM or higher recommended. NVIDIA, ATI, and Intel chipsets supported. 24-bit capable graphics accelerator. OpenGL version 2.0 runtime minimum is required, and Shader Model 3.0 or higher is recommended. Be sure to use the latest available drivers.
USB port: Required for connecting handheld devices[7]
SD/micro-SD card slot or reader: Required for connecting memory card device

Field Computer Specifications

Minimum field computer (handheld) specifications are based on requirements for ArcPad software, available here: http://resources.arcgis.com/en/communities/arcpad/.

Mobile Devices

Processor: ARM-based processors, including Intel (StrongARM, X-Scale), Samsung, Texas Instruments, Atmel
Operating System: Windows Mobile 5, 6, 6.1, 6.5, Windows Embedded Handheld 6.5.[8]

[3] Windows XP Home Edition, XP 64-bit, Windows Vista, Windows 7 Home Premium, and Windows 8/8.1 are *not* supported. Although Sentinel may install, no deficiencies that are not repeatable in supported operating systems will be addressed, and no technical support specific to installation or operation on the non-supported operating system will be provided
[4] Sentinel GIS Service Request: Web is the only application that is supported on a server.
[5] Sentinel GIS Service Request: Web is the only application that is supported on a server.
[6] Sentinel GIS Service Request: Web is the only application that is supported on a server.
[7] Windows Mobile device connection through Microsoft Windows Mobile Device Center only support one device connection at a time.

RAM: 128 MB (recommended)
SD card: 4 GB or larger recommended (particularly if using aerial photography on mobile device)
9-pin COM port for Adulticiding, built in GPS

Windows Devices

Processor: PC-Intel® 750 MHz (or higher), 32-bit and 64-bit
Operating System: Windows 7 (32-bit and 64-bit), Windows 10 (32-bit and 64-bit).
RAM: 512 MB (or higher)
SD Card Slot or other removable memory, COM port for Adulticiding, built in GPS

Required Software

Sentinel GIS is built on ESRI ArcGIS Desktop and ArcPad software. It also relies on Microsoft technologies for handheld data synchronization.

Desktop:

ArcGIS Desktop 10.3.x, 10.4.x, 10.5.x, 10.6 (Basic, Standard, or Advanced)[9]
Microsoft Windows Mobile Device Center (Windows 7, 10)[10]
DataLink GIS 4 or greater
.NET Framework 4.5
Visual C++ 2015 Redistributable (32-bit): required only for Sentinel GIS: Adulticiding GeoPackage
Crystal Reports Redistributable for Visual Studio 2008 (32-bit)
SAP Crystal Reports 13 Redistributable SP 16: required only for Sentinel GIS: Service Request (Web)
Microsoft Internet Information Services (IIS 7): required only for Sentinel GIS: Service Request (Web)

Mobile:

ArcPad ArcPad 10.0.4, 10.2.2, 10.2.3, 10.2.4[11]
Microsoft .NET Compact Framework 3.5[12]
VBScript Runtime Library for Windows Mobile[13]

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[8] Supported through DataLink GIS Memory Card Device synchronization.
[9] All Sentinel GIS functionality is supported at the Basic license level, except SDE data storage which requires Standard or Advanced license level. Previous versions of ArcGIS Desktop software are not supported. To update to the current version of ArcGIS Desktop, contact your local ESRI Sales Office. ArcGIS Desktop software is not required for Sentinel GIS: Service Request (Web).
[10] Microsoft Windows Mobile Device Center is a free download from Microsoft. Direct link: Windows Mobile Device Center: *http://www.microsoft.com/downloads/details.aspx?FamilyID=46f72df1-e46a-4a5f-a791-09f07aaa1914&displaylang=en*
[11] ArcPad 10.2 and 10.2.1 are not supported because they contain bugs that interfere with Sentinel operations.
[12] Required for Windows Mobile 5 devices. Windows Mobile 6.x and Windows Embedded 6.x devices already have these components built into the operating system. The .NET Compact Framework 3.5 is available as a free download from Microsoft.

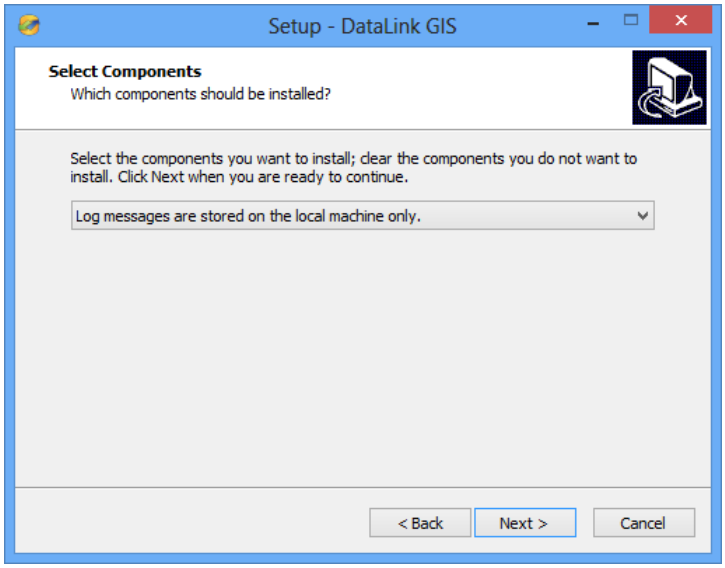
Installation Instructions

All Sentinel GIS Modules

Desktop Components

Please install the desktop software **in the following order**:

1. Install Microsoft Windows Mobile Device Center (Windows 7/8/10). *Not required if mobile devices are Windows tablets.*
2. Install DataLink GIS v4.x using the serial number and authorization key provided. Additional installation information for DataLink GIS v4.x is provided below.
    a. After a welcome screen and a license agreement screen, choose the logging option. DataLink GIS logs all DataLink GIS and Sentinel GIS system logs, including error messages, to a SQLce compact database. This database is created in the DataLink GIS home path. Messages are sent to the database using the ElecData Logging Service.

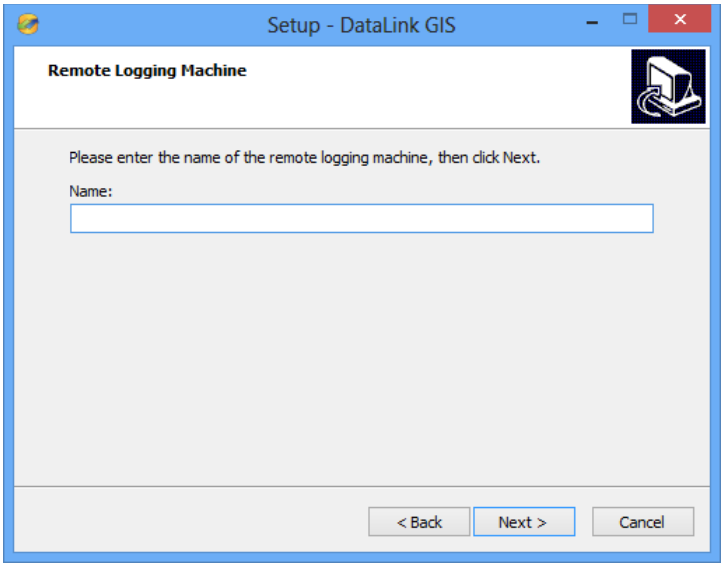


    i. Local Logging – Select to install the DataLink GIS program, and to configure the local computer as the logging system server. All log messages will be stored to a SQLce database in the DataLink GIS home path.
    ii. Logging Service Only – Select to install only the logging service on the local computer, without installing the DataLink GIS program. This would be preferable if the local computer is responsible for storing log messages from all other computers, but does not need DataLink GIS or Sentinel GIS programs.
    iii. Remote Logging – Select to install the DataLink GIS program, and to configure it to point to another PC that is acting as the logging server. In this case, the ElecData Logging Service on the local computer sends logging messages to the

[13] Required for Windows Mobile 6.5 and Windows Embedded 6.5 devices for proper display of user messages in Arcpad. Built in to Windows Mobile 5.0, 6.0, and 6.1.

ElecData Logging Service on the remote computer, which then stores the messages to the database in its DataLink GIS home path. ***Note: The logging service uses .NET Remoting, which requires port 8086 to be open in the firewall if it is to accept incoming messages.***

b. If the Remote Logging option is selected, enter the machine name or IP address:



c. Enter user and organization information and press Next, then enter the serial name and authorization and press Next. Choose whether to create a desktop icon then press Next.

d. Review options then press Install.

e. By default, all settings for DataLink GIS and Sentinel modules are stored in an SCM.config file in the DataLink GIS "Merged Files" path. To change this to a shared location:

   i. Move the SCM.config file to a shared location

   ii. Open the c:\DataLink GIS\SCM.path file in a text editor, and specify the UNC path name where the SCM.config file is located (e.g. \\MyServer\Shared\SentinelGIS\SCM.config)

   iii. Ensure that all computer users that will have DataLink GIS or Sentinel GIS installed have read/write permissions to the SCM.config file

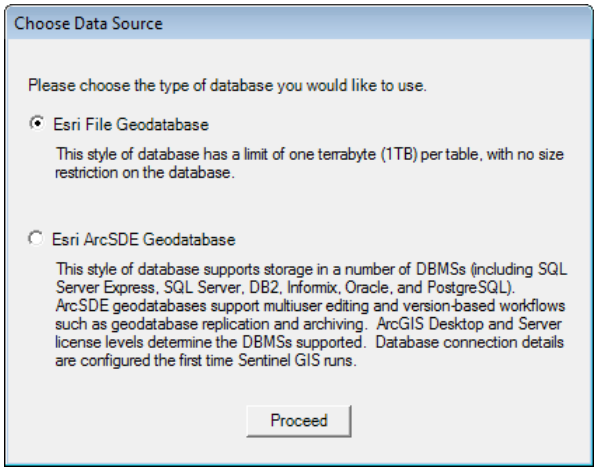
3. Install Microsoft .NET Compact Framework 3.5, which is available on Microsoft's Website (only required if you will later deploy Sentinel to Windows Mobile 5 devices). Search for '.NET Compact Framework 3.5 Redistributable.'

4. Install and authorize ArcGIS Desktop 10.3.x, 10.4.x, 10.5.x, or 10.6 software using the ESRI installation media. Installation media and licensing information is available by logging in to the Esri Customer Portal at http://my.esri.com.

5. Install the Crystal Reports redistributable (found on your Sentinel GIS installation disk). Use CRRedist2008_x86.msi for all operating systems.

6. Install the SAP Crystal Reports 13 redistributable if you are using Sentinel GIS Service Request Web. Use CRRuntime_32bit_13_0_16.msi for all operating systems.
7. Install the Sentinel GIS module (Larviciding, Adulticiding, Surveillance, or Service Request Desktop). Most files will be installed to the local hard drive, but handheld application files will be installed to the location specified in DataLink GIS' Hand-Held Software Path. If more than one computer will be used with DataLink GIS to synchronize handhelds, please specify a valid shared file path in DataLink GIS before completing this step. See the *Configuration* section of this guide for more information.

   During installation of the first Sentinel GIS module you will be asked to choose which geodatabase type to use. Once selected, this choice is used for all Sentinel GIS modules, which all share a common 'SentinelGIS' geodatabase. *Note: personal geodatabases (MDB) are not supported.*



   a. File geodatabase – select for local or network database storage. File geodatabases only support one editor at a time, although many concurrent viewers are supported. The geodatabase will be created in the configured DataLink GIS "Merged Files" path the first time that Sentinel GIS desktop tools are run.
   b. ArcSDE geodatabase – select for storage in a standard RDBMS (e.g. SQL Server Express, SQL Server, etc.), multi-user editing (requires ArcGIS Server), and other capabilities. Configuration of SDE connection details occurs the first time Sentinel GIS desktop tools are run. *Note: ArcGIS Desktop Standard or Advanced license level is required for SDE.*
8. During installation of Sentinel GIS: Service Request Desktop you will be asked to choose the database type and the file folder location for the Service Request data. See the section on Service Request Web installation for more information about configuring the Service Request database.
9. Install ArcPad 10.0.4, 10.2.2, 10.2.3, or 10.2.4 to your PC using the ArcPad installation media. This installs the ArcPad Data Manager and ArcPad Deployment Manager, which is needed for

extracting map data for use in ArcPad, and for installing ArcPad and ArcPad components to handheld devices. *Note: ArcPad does not need to be registered on the desktop for this.*

Mobile Components

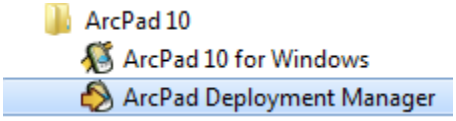
If your mobile devices are purchased through Frontier Precision, all components are preinstalled on your mobile devices before they are shipped. These directions can be following should you need to reinstall the software for any reason.

Windows Tablets

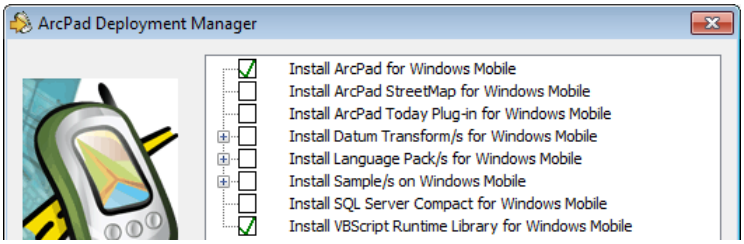
1. Copy the ArcPad 10.0.4, 10.2.2, 10.2.3, or 10.2.4 installer to a USB flash drive or other removable memory
2. Plug it in it to the Windows tablet
3. Run the ArcPad installer
4. When warned that Windows Mobile Device Center was not detected, click OK and press Next
5. When warned that Python was not detected, click OK and press Next
6. When warned that ArcGIS Desktop was not detected, click OK and press Next
7. Finish the installer
8. Start ArcPad and enter your registration number
9. No other components need to be installed

Windows Mobile Devices

1. Connect your handheld to your PC.
2. Install ArcPad 10.0.4, 10.2.2, 10.2.3, or 10.2.4 to your mobile device.[14]
    a. To install to the Mobile Device, click Start > All Programs > ArcGIS > ArcPad 10 > ArcPad Deployment Manager.



    b. Select the options to 'Install ArcPad for Windows Mobile' then press the 'Deploy' button.
    c. Also select the 'Install VBScript Runtime Library for Windows Mobile' *if you are using a Windows Mobile 6.5 or Windows Embedded Handheld 6.5 device.*



[14] For complete details, see the ArcPad Installation Guide, which is installed to your desktop with ArcPad, and can be found in \Program Files\ArcPad\Help

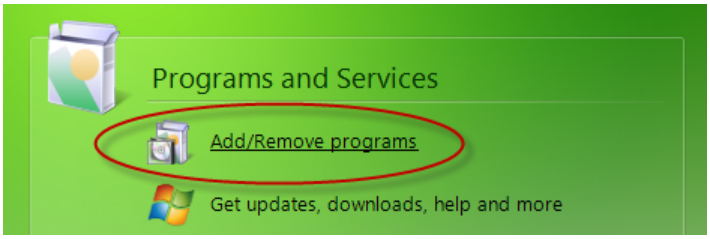
d. Also select the 'Install SQL Server Compact for Windows Mobile' if you will be using the Larviciding Storm Drain applet, because this uses ArcPad AXF files instead of shapefiles. No other components need to be installed for Sentinel GIS operation.

3. Install Microsoft .NET Compact Framework 3.5 to your Windows Mobile 5 mobile device (this option is not required for Windows Mobile 6, 6.1, or 6.5 devices).

Windows Mobile Device Center Instructions

a. Open the Windows Mobile Device Center.
b. Click Programs and Services, then 'more.'

c. Click Add/Remove programs.



d. Check the box for 'Microsoft .NET CF 3.5'
e. Click OK to install to the mobile device

Sentinel GIS components are installed using DataLink GIS software, after program settings have been configured and map data extracted. For detailed instructions, see each Sentinel GIS module's Quick Start Guide.

Service Request Web

The Service Request Web application should be installed on a computer that will always remain on during business hours, when Service Requests will be entered. This computer becomes the Web Server for the Intranet application that is used to enter Service Requests, so it has to be accessible to any other computer that will run the Service Request Web application. Therefore, it should have a machine name

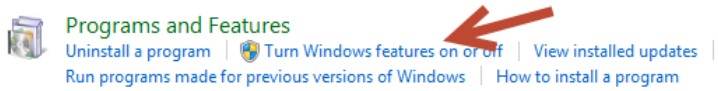
that will not change, or a Static IP address[15]. It does not have to have ESRI ArcGIS Desktop or ArcPad software or DataLink GIS installed. If SQL Server Express was chosen as the database type, the SQL Server instance can be running on a different computer. Service Request: Web only has to have access to the location of the Service Request database.

Please install the Web application software **in the following order**:

1. Install or enable Microsoft Windows Internet Information Services (IIS) features.

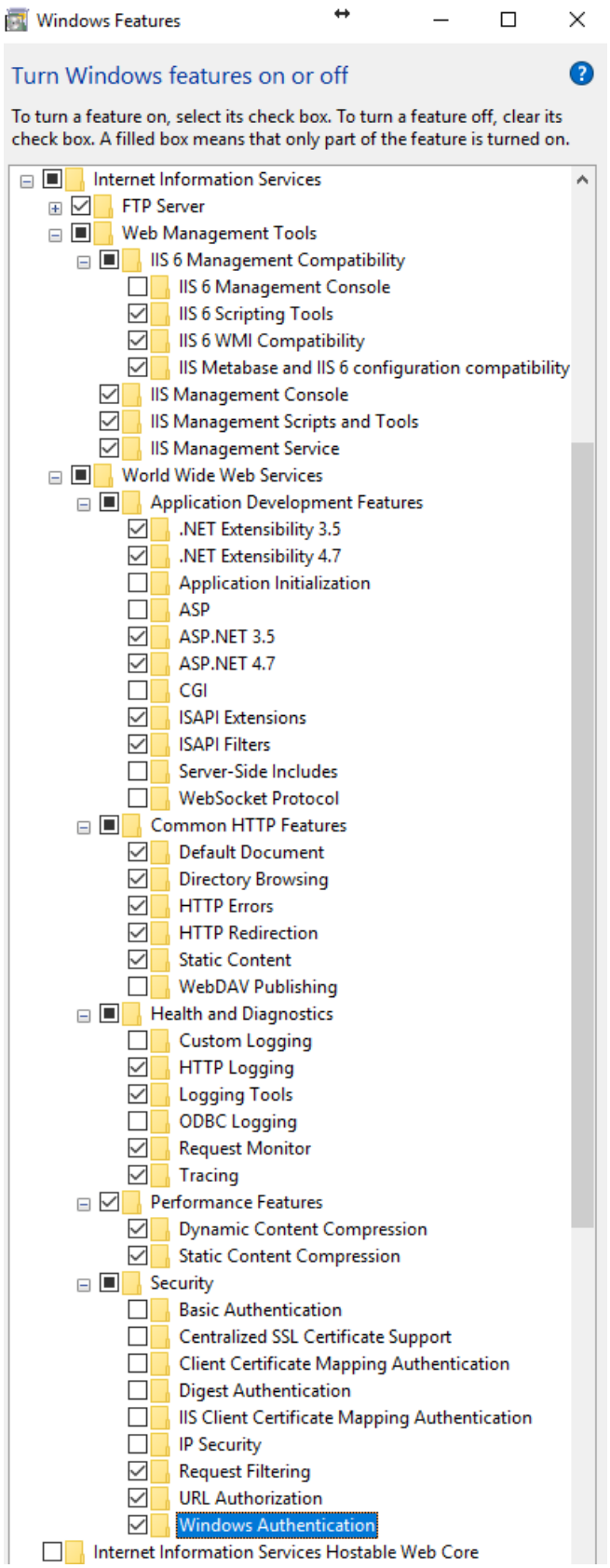
   Windows 7/10/Sever 2012 R2/Server 2016 Instructions

   a. Go to your PC Control Panel or Settings and search for "Turn Windows features on or off." In Windows Server, you can also get here from Server Manager > Add Roles and Features.

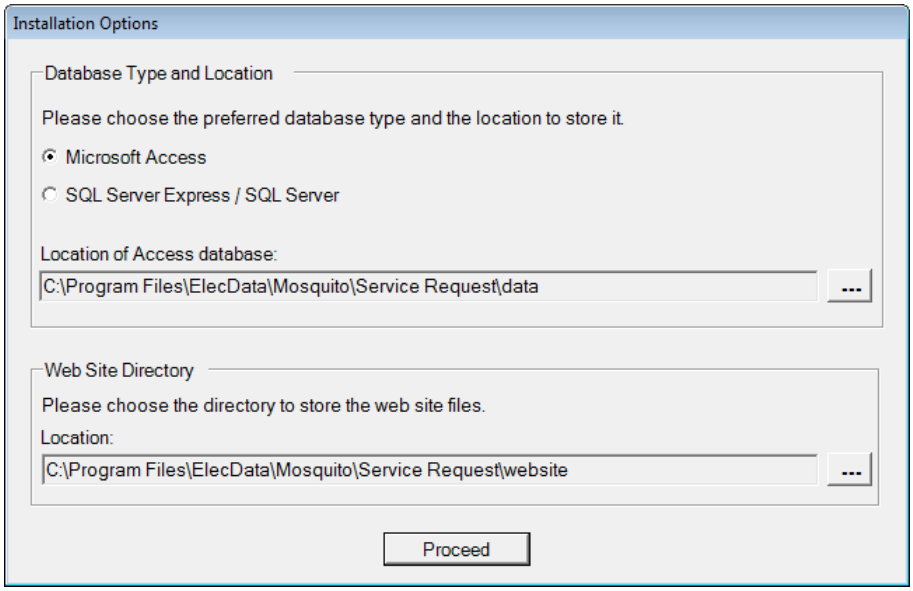
   

   b. Expand and check the boxes listed below in the Internet Information Services options:

[15] Configuring a Static IP address is outside the scope of support offered for Sentinel GIS. Please contact your IT support to set a Static IP address.


Windows Features
Turn Windows features on or off
To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.
Internet Information Services
FTP Server
Web Management Tools
IIS 6 Management Compatibility
IIS 6 Management Console
IIS 6 Scripting Tools
IIS 6 WMI Compatibility
IIS Metabase and IIS 6 configuration compatibility
IIS Management Console
IIS Management Scripts and Tools
IIS Management Service
World Wide Web Services
Application Development Features
.NET Extensibility 3.5
.NET Extensibility 4.7
Application Initialization
ASP
ASP.NET 3.5
ASP.NET 4.7
CGI
ISAPI Extensions
ISAPI Filters
Server-Side Includes
WebSocket Protocol
Common HTTP Features
Default Document
Directory Browsing
HTTP Errors
HTTP Redirection
Static Content
WebDAV Publishing
Health and Diagnostics
Custom Logging
HTTP Logging
Logging Tools
ODBC Logging
Request Monitor
Tracing
Performance Features
Dynamic Content Compression
Static Content Compression
Security
Basic Authentication
Centralized SSL Certificate Support
Client Certificate Mapping Authentication
Digest Authentication
IIS Client Certificate Mapping Authentication
IP Security
Request Filtering
URL Authorization
Windows Authentication
Internet Information Services Hostable Web Core

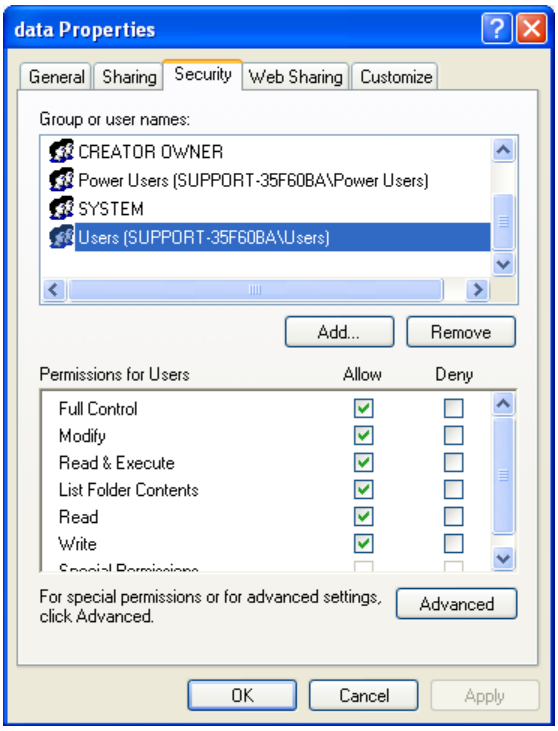
2. Ensure Microsoft .NET Framework 4.5.2 or greater is installed or enabled (.NET 4.x is generally included in the OS for Windows 10 and Windows Server, but not always).
3. Install the SAP Crystal Reports Runtime 13 SP 16 (32-bit) for Visual Studio from the Prerequisites folder.
4. Install the Sentinel GIS Service Request Web Application from your product CD. **Please Note:** During installation of Sentinel GIS: Service Request Web you will be asked to choose the database type and the file folder location for the Service Request data. The choices specified here should match the choices specified when installing the Service Request ArcGIS Desktop program on other client machines. You will also be asked to specify the Web Site Directory.



   a. Microsoft Access: Select if you intend to use the Service Request: Web application locally (PC or intranet). Microsoft Access does not need to be installed in order to use this option. **Please Note:** The Web application data entry form provided with the Service Request module is intended for local (PC or intranet) use.
   b. SQL Server Express: Select if you intend to use with SQL Server. **Please Note:** Configuration of SQL Server (beyond installation and configuration of Service Request), is outside of the scope of support for Sentinel GIS.
   c. Data file location defaults to local hard drive. If SQL Server Express database type is selected, database template files (ServiceRequest.mdf and ServiceRequest_Log.ldf) will be placed in the location specified. The SQL data source will then have to be configured by the SQL Database Administrator. SQL Server will manage support for remote connections to the data source. For information see the heading below entitled 'Configuring the SQL Data Source.'
   d. Web Site Directory defaults to local hard drive.
5. If Microsoft Access was chosen as the database type, you may need to configure permissions for the database or the folder where the database is stored.

a. Use Windows Explorer to navigate to the directory containing the ServiceRequest database file (by default, this is C:\Program Files\Elecdata\Mosquito\Service Request\data). Right-click on the file and choose Properties, then click on the Security tab.[16]

b. Click on the Security tab, then select the 'Users' group and click the checkbox under the Allow column for Full Control. Click OK.



c. Note: you may also have to add "NETWORK" user (IIS 6 and 7) or "IUSR" user (IIS 7.5 and 8) and grant read/write permissions. (ASP .NET Web applications authenticate as the NETWORK user in IIS 6 and 7, and so must have permissions to make changes to the database file. If the MDB is on a network file path, the IIS App or App Pool may need to be configured to Connect as a user other than "NETWORK", which typically has access only to local computer resources.)

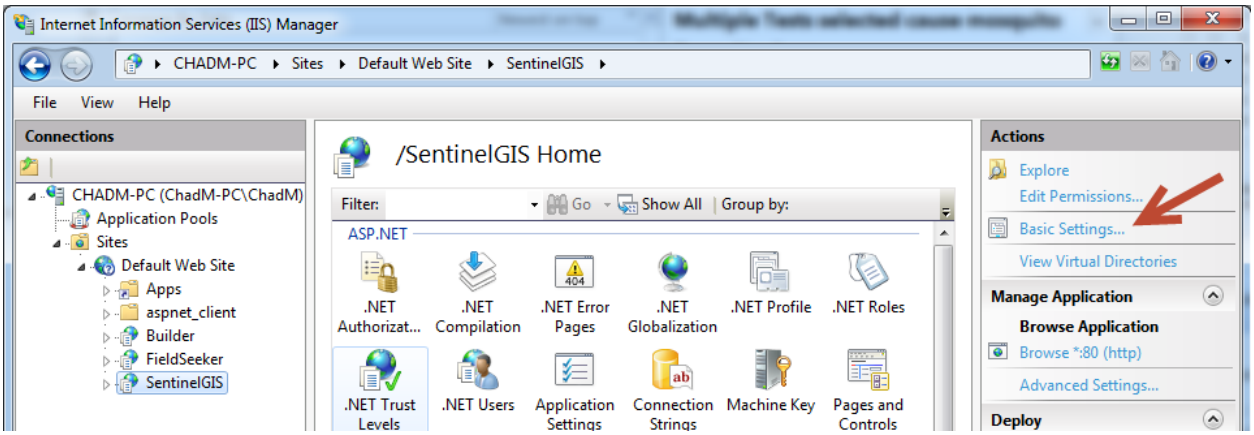
[16] If no Security tab is present, the machine is probably on a Workgroup (as opposed to a domain) and Simple File Sharing is enabled by default. In that case, choose Start > Settings > Control Panel, double-click on Folder Options, choose the View tab, and clear the checkbox next to "Use Simple File Sharing." After this is done, right-clicking on the ServiceRequest.mdb file and choosing Properties should display the Security tab.

Configure ASP .NET Version Used by Service Request Website (IIS 7.x/8.x)

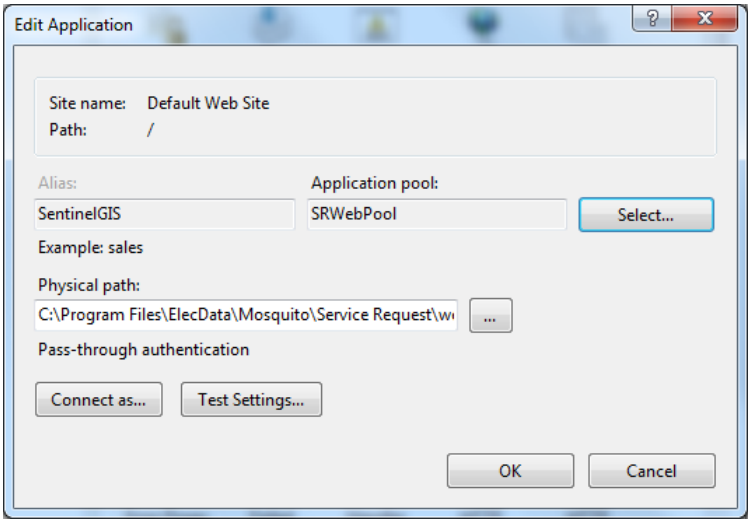
Newer IIS versions that are part of Windows 7, Windows 10, Windows Server 2008 R2, Windows Server 2012 R2, and Windows Server 2016 require that you specify the application pool that the Web application is part of, then specify the version of .NET Framework used by the application pool. **The following settings are handled automatically by the installe**r, but to verify these settings check the following.

To configure:

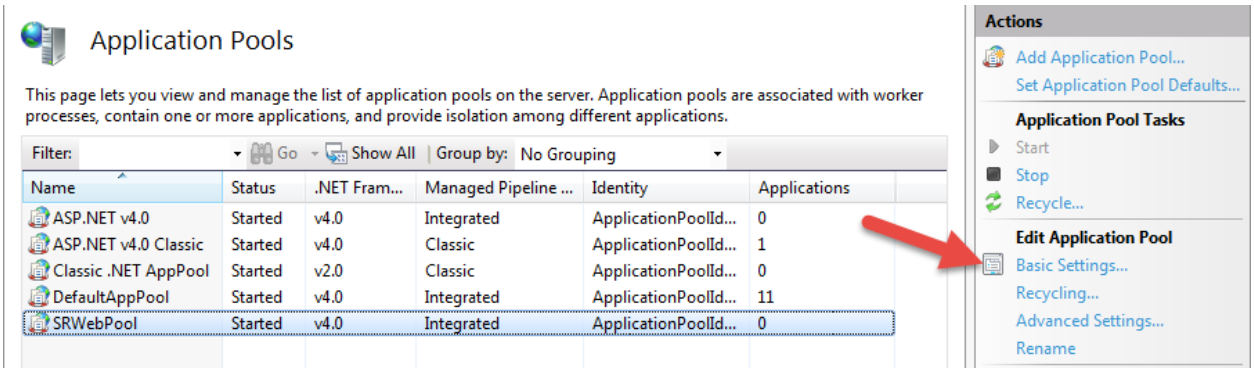
1. Open Internet Information Services Manager
2. Browse to the SentinelGIS Web Site then press Basic Settings…



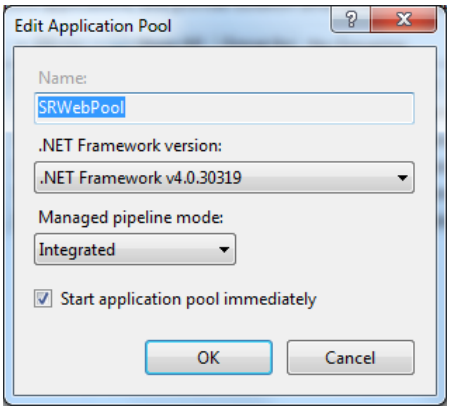
3. Verify the application pool that SentinelGIS is part of – this should default to SRWebPool.



4. Browse to Application Pools. Select the application pool that SentinelGIS is part of, and verify that it uses .NET v4.0 or greater.



5. If not, press Basic Settings and change the .NET Framework version.

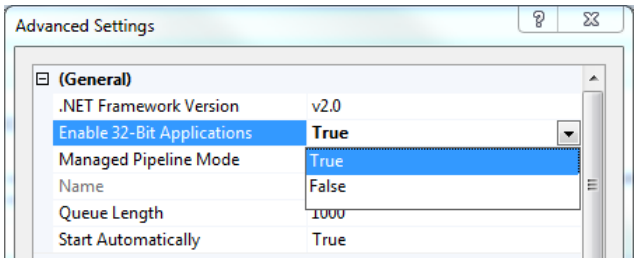


Configure 32-bit Application Support (Windows 7/8/10 64-bit)

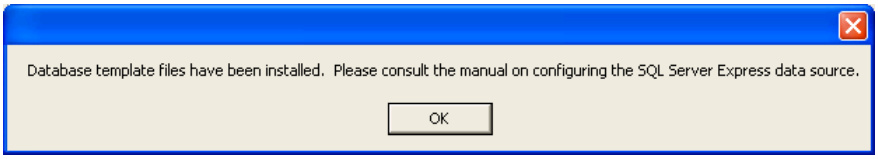
If Service Request Web is installed on a 64-bit operating system, the Web app pool will have 32-bit support enabled.

To verify support for 32-bit Web application on a 64-bit IIS Web server:

1. Open Internet Information Services Manager.
2. Browse to Application Pools.
3. Select SRWebPool, then select Advanced Settings…
4. Verify Enable 32-Bit Applications is set to True.



Configure the SQL Data Source (SQL 2008 R2, 2012, 2014, 2016)



If the SQL Server database type was selected, database template files (ServiceRequest.mdf and ServiceRequest_Log.ldf) were placed in the specified location. The database template must be attached to the SQL Server instance. This is done using SQL Server Management Studio.

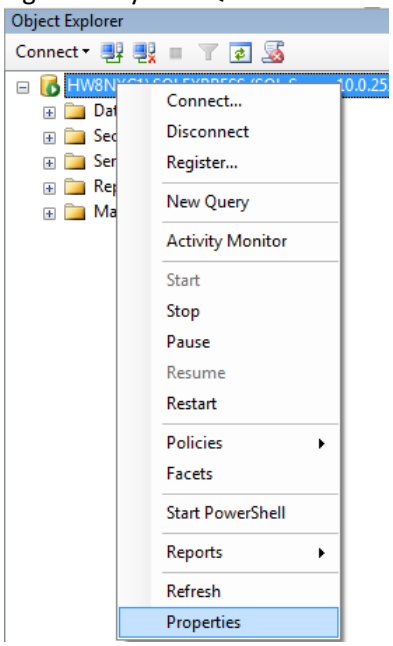
Configure Remote Connection Settings

If the SQL server is on a different machine than the web application or the desktop tools, support for remote connections must be enabled.

In addition to the following steps, firewall modifications may have to be done on the server to allow connections to it.[17]

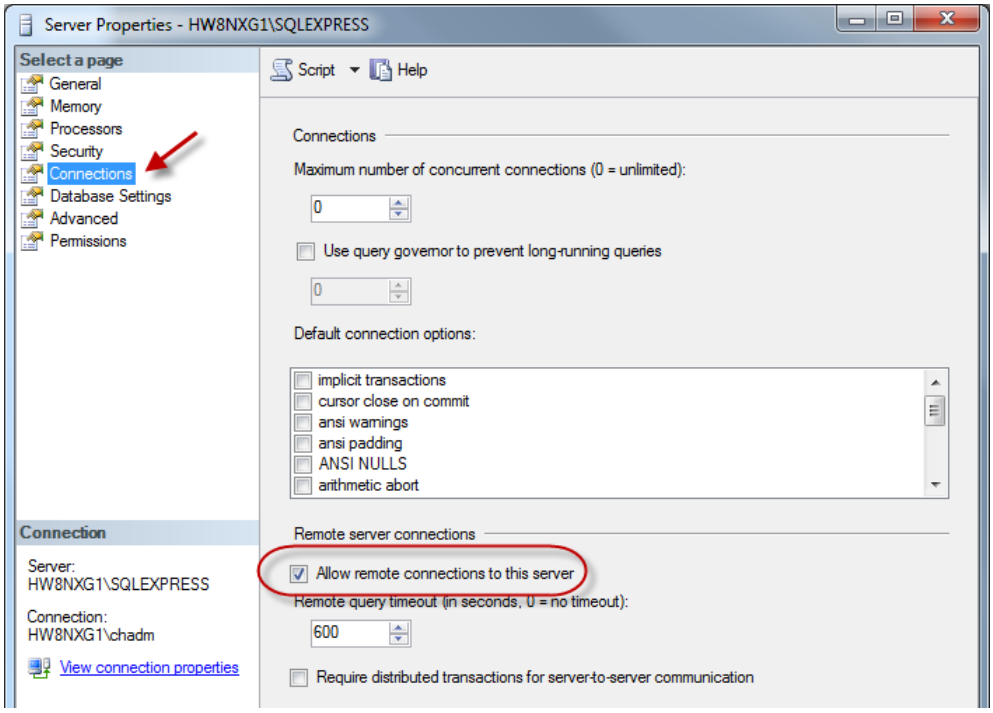
Enable Remote Connections

1. Run SQL Server Management Studio and connect to your SQL Server instance.
2. Right-click your SQL Server instance and select Properties.



[17] Firewall modifications and Server configurations are outside of the scope of support provided for Sentinel GIS. Please contact your IT support for assistance.

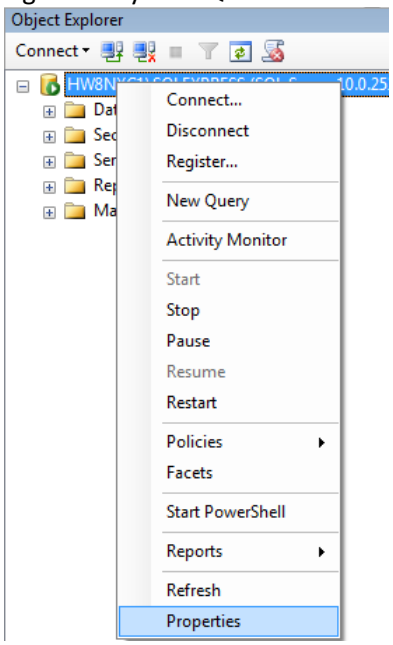
3. Selection Connections, then check the box to “Allow remote connections to this server.”



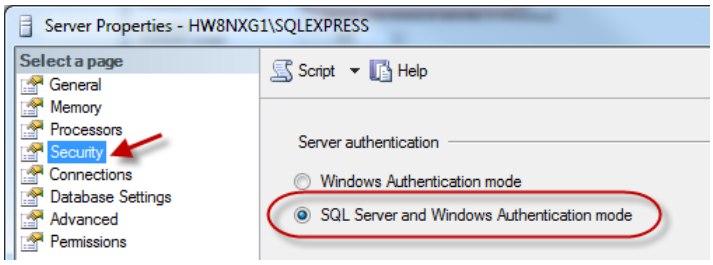
Enable SQL Server Authentication

Note: this step is required if the Service Request Web application and Service Request ArcGIS clients will connect to the database using a single login. The alternative is to add group or user permissions to the Service Request database using SQL Server Management Studio, and to set up the SQL Connector options to use Windows Authentication.

1. Run SQL Server Management Studio and connect to your SQL Server instance.
2. Right-click your SQL Server instance and select Properties.



3. Click on the Security page and select the option for "SQL Server and Windows Authentication mode."

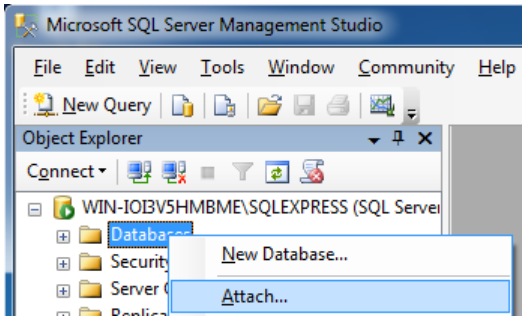


Attach database and add login

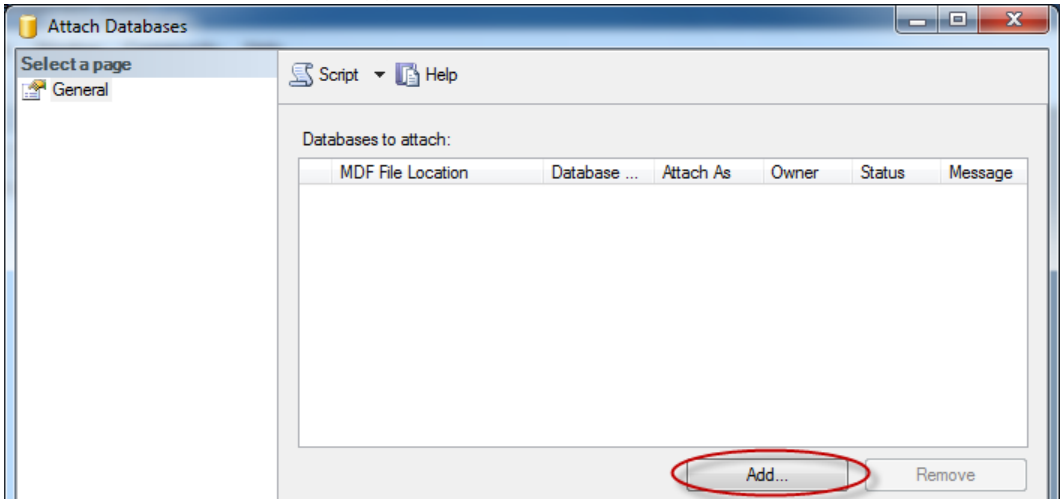
The database template files (ServiceRequest.mdf and ServiceRequest_log.ldf) that were installed by the post-installer need to be attached to the server, so that it can administer connection attempts and data requests.

Configure the SQL Server using the Microsoft SQL Server Management Studio Express program.

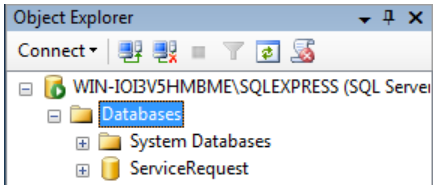
1. Attach the template files to SQL Server Express. In the Object Explorer window, right-click on *Databases* and choose *Attach*.



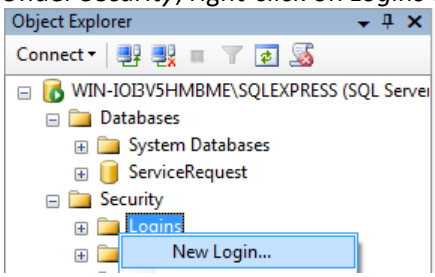
2. In the Attach Databases window, click the Add button.



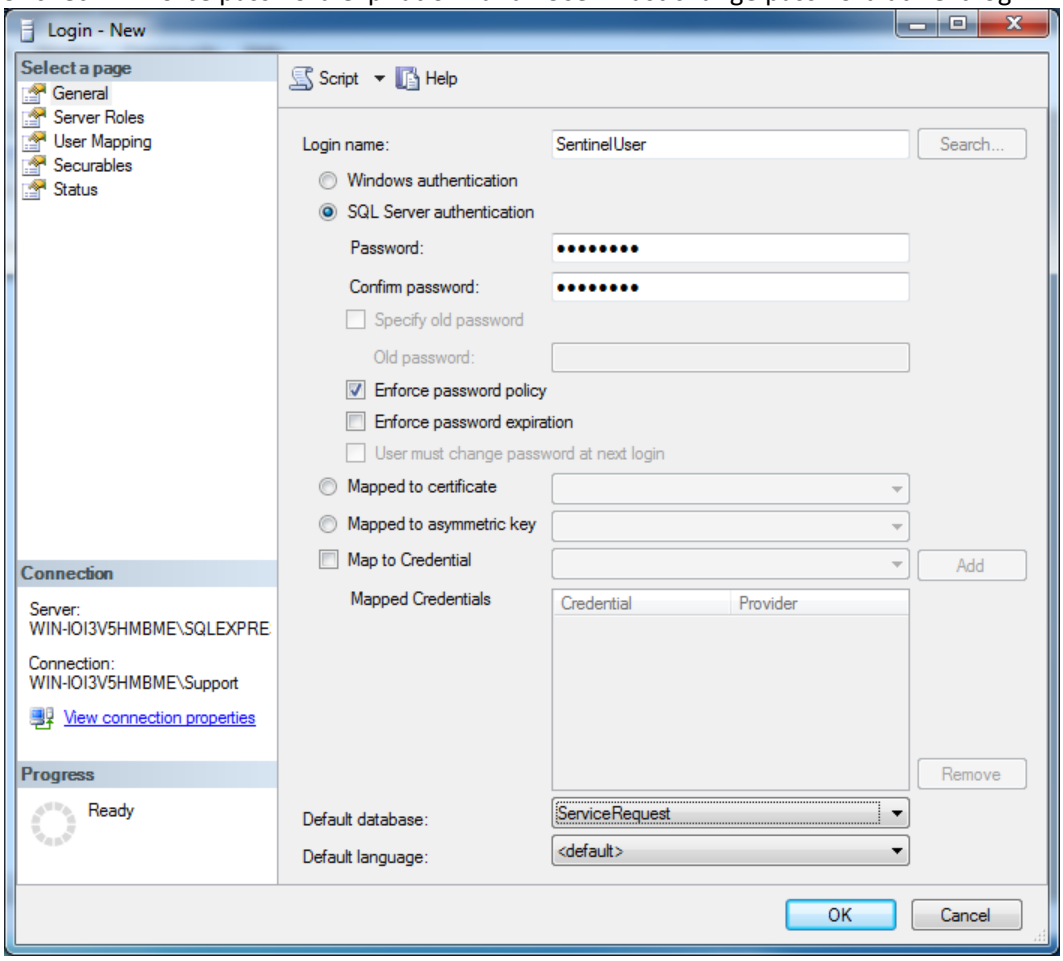
3. Navigate to the template directory that was chosen when the program was installed, then select the ServiceRequest.mdf file under that directory and click OK. By default, this is c:\Program Files\Elecdata\Mosquito\Service Request\Data.
4. Click OK in the Attach Databases window. The database should appear in the Object Explorer window.



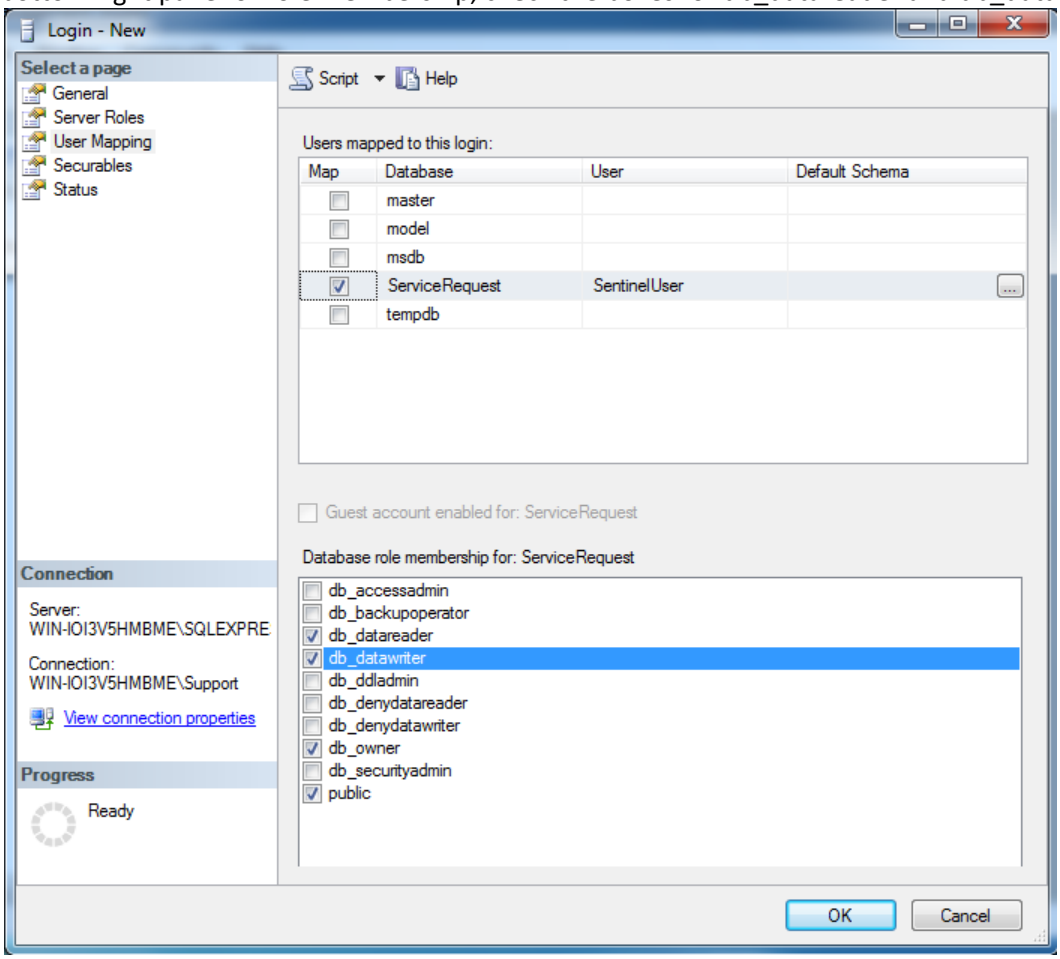
5. Under *Security*, right-click on *Logins* and choose *New Login*.



6. Create the login account. In the General page, choose a login name and SQL Server authentication. Enter a password for this login. The default database doesn't have to be set. Uncheck "Enforce password expiration" and "User must change password at next login."



7. Next, click on the User Mapping page and check the box to the left of ServiceRequest. In the bottom right pane for role membership, check the boxes for db_datareader and db_datawriter.

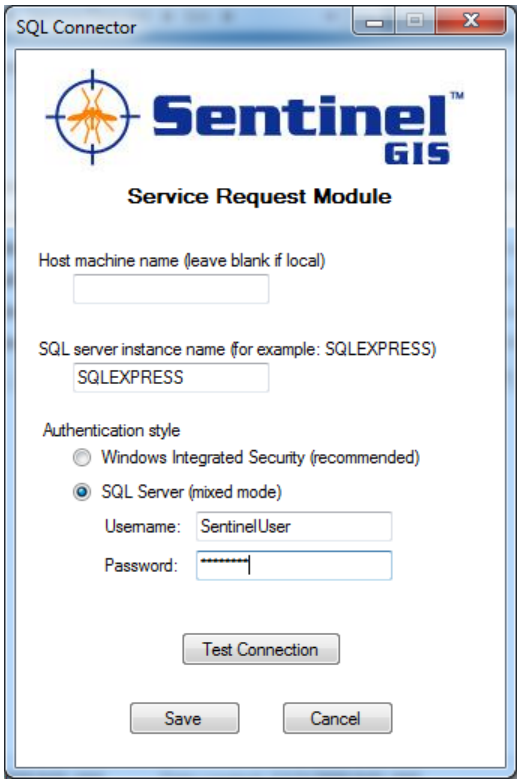


Click OK. The login will now be associated with the ServiceRequest database.

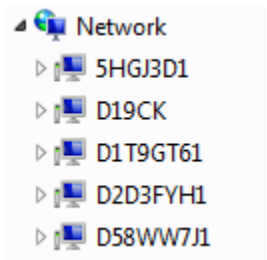
Configure SQL Connections for Service Request Applications

The SQL Connector program must be run on the Service Request 'Web Server' machine to configure the Web application's access to the SQL Server data source.

This program is found in c:\Program Files\ElecData\Mosquito\Service Request\bin\. It will also run the first time you go to ArcMap > Service Request > Application Configuration Utility. It must be configured to point to the host machine name (computer name or IP address) and SQL server instance, and specify the Username and Password to authenticate to the SQL server.



Host machine name (leave blank if local) – if the SQL Server instance is running on the local computer, leave this blank. If the SQL Server instance is running on another computer on the network, enter the **computer name** (as found in Computer > Network) **or IP address.**



SQL server instance name – if running SQL Server Express, the default instance name is **SQLEXPRESS**. If running SQL Server, the default instance name does not need to be entered. Instead, enter a space.

Authentication style – select SQL Server (mixed mode) and enter the Username and Password to match the login created in SQL Server Management Studio (previous section, Step 6). Or, choose Windows Integrated Security. Please note this requires adding Group or User permissions to the ServiceRequest database in SQL Server Management Studio.

Test Connection – press this button to verify the settings are correct.

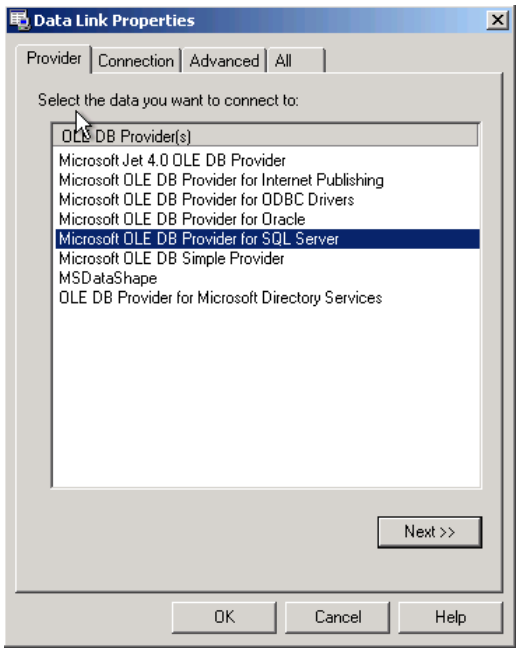
Save – press this button to save the connection settings to the SCM.config file. Please note that $DataLinkHome\SCM.path file points to this configuration file. If Service Request Web is installed on a Web server, either the SCM.path file should point to a shared SCM.config file that is also used by ArcGIS Desktop clients, or if the SCM.config file is isolated, it should have the same database connection settings as those configured on ArcGIS Desktop client machines.

Configure SQL Connections for ArcGIS

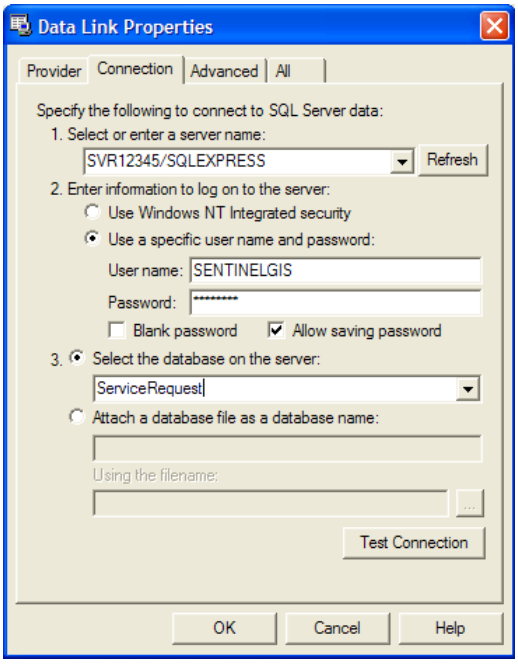
An OLE DB connection must be configured in ArcGIS to access the SQL Server data source as a map layer that can be viewed with other GIS data.

1. Start ArcCatalog. Browse to Database Connections and double-click on Add OLE DB Connection. *Note: this option is not available in ArcGIS 10.1 or newer. Please see the following for steps on how to add it:* http://resources.arcgis.com/en/help/main/10.1/index.html#//006600000452000000

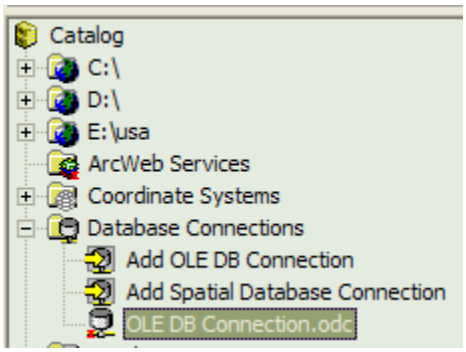
2. For the provider, choose Microsoft OLE DB Provider for SQL Server. Click Next.



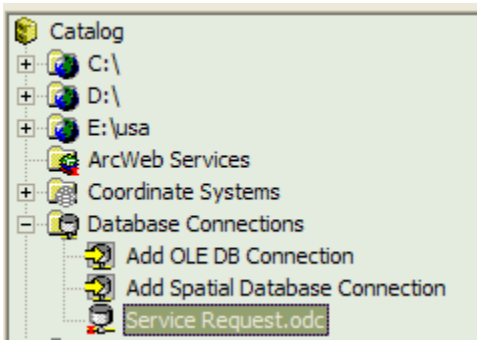
3. In the Connection tab, enter the server name, followed by a backslash, then the word SQLEXPRESS. If SQL Server Express is running on the same machine as ArcMap, use a period for the machine name (.\SQLEXPRESS). Choose the authentication type. Select the 'Allow saving password' checkbox to avoid requiring a password to be entered each time ArcMap loads the map containing the ServiceRequest data source. Choose ServiceRequest from the database to use on the server. When finished, click the Test Connection button to see if the connection succeeds. When finished, click OK.



4. A new OLE DB connection should appear in the tree view.



5. Select it, press the F2 key, and rename it to something relevant, such as Service Request.odc.



6. This connection will be used in ArcMap for displaying the Service Requests on the map.

Configuration

File Paths

Sentinel GIS desktop tools for Adulticiding, Larviciding, & Surveillance operate on a common Esri file or SDE geodatabase named 'SentinelGIS.' This database is created by the desktop tools the first time that the Configuration Utility for a module is run, or the first time data is extracted for a module (both of these operations are found in ArcMap, in the SentinelGIS toolbar, in the drop-down specific to that module). The file path or SDE connection where the database or database objects is created is configured in DataLink GIS.

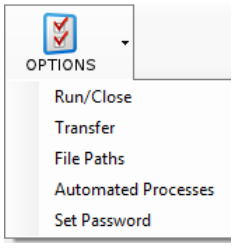
Service Request operates on an Access MDB or SQL Server database named 'ServiceRequest.' This database is placed by the installer. In the case of a SQL Server database, access is configured manually (see the previous section on configuring the Service Request application).

Configuration settings and ArcPad applet (toolbar and script) files for each module are placed on your computer by the respective installer. The file path where these files are placed is also configured in DataLink GIS. Configuration settings such as zone layer, identify layers, no-spray zones, tracklog interval, and others are saved in configuration files in this path. These files and configuration settings are then installed to the handhelds using DataLink GIS.

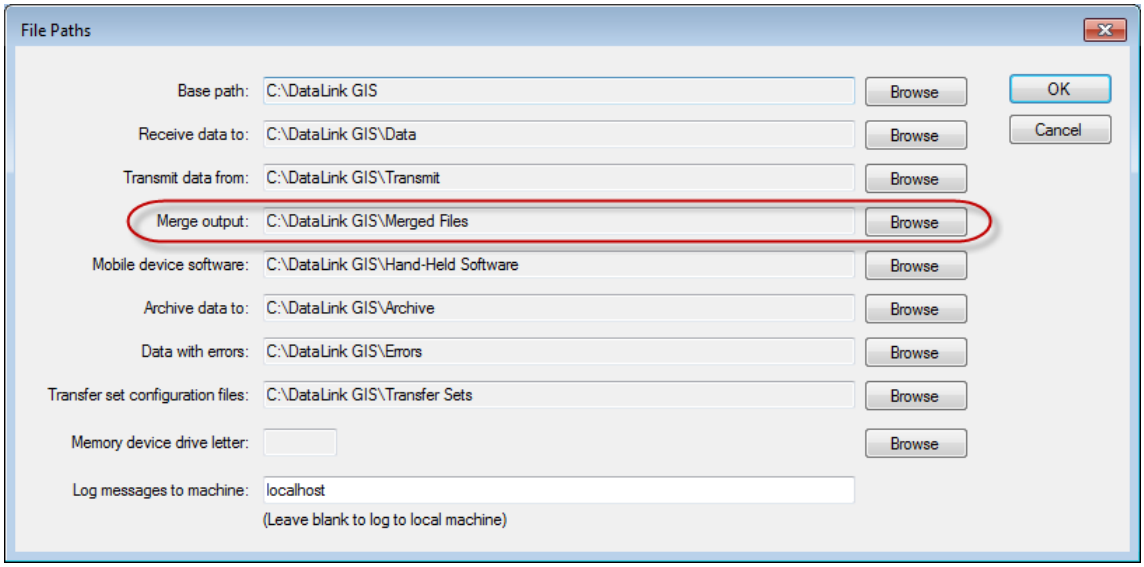
If multiple computers in an office will be running Sentinel GIS, the DataLink GIS file paths for each computer should be set to a mutually accessible network file path, prior to installation of Sentinel GIS modules. If file paths are changed after the modules are installed or the SentinelGIS geodatabase is created, files will not be moved automatically to the new locations. They can manually be moved from their old location to the newly specified folder.

Merged Files Path (File Geodatabase or SDE Connection File Location)

1. Start DataLink GIS.
2. Select Options > File Paths.



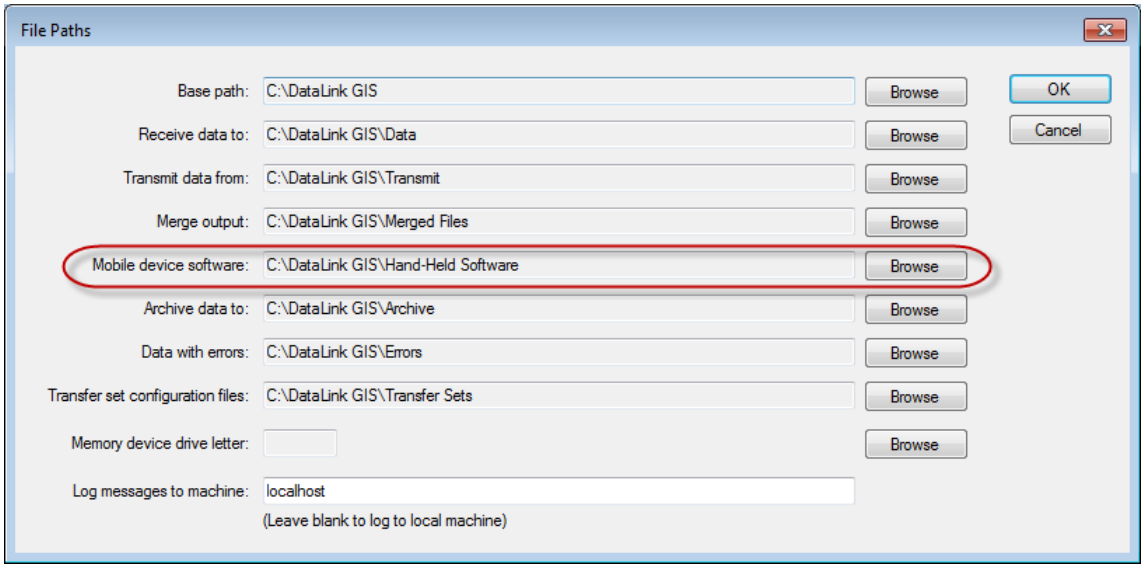
3. Set the Merge Output path to the location where the geodatabase should be created (or will be moved to if it already exists).



4. Press OK to save changes.
5. If ArcMap is open, exit and re-open to refresh the Sentinel GIS geodatabase location.

Mobile Device Software Path (Applets and Configuration Settings Location)

1. Start DataLink GIS.
2. Select Options > File Paths.
3. Set the Hand-held Software to the location where the applet and script files should be installed to (or will be moved to if Sentinel GIS was already installed).



4. Press OK to save changes.
5. If ArcMap is open, exit and re-open to refresh the hand-held software path.

Shared Configuration Settings

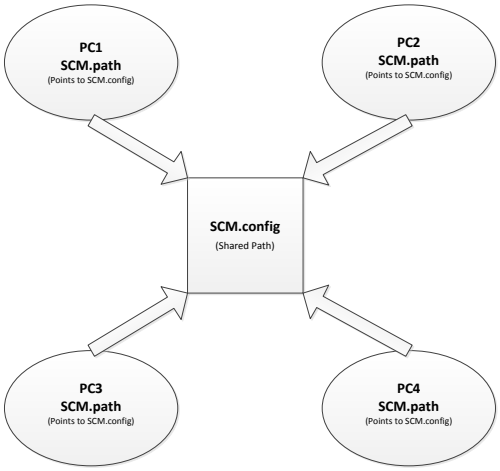
DataLink GIS and Sentinel GIS modules share configuration settings in an XML file named “SCM.config.” By default, this file is created in the same location as the geodatabase (the DataLink GIS “Merged Files” path).

The actual location of the SCM.config file is specified in a file called “SCM.path” stored in the DataLink GIS home directory (c:\DataLink GIS or c:\Program Files\DataLink GIS). This file is created when DataLink GIS is installed.

Changing the Merged Files path does not move the config file, or change the SCM.path file contents. Therefore, if the settings file is moved, the SCM.path file must be modified manually in a text editor.

Multiple client machines can share the settings in the SCM.config file. Each client machine’s SCM.path file must point to the shared file.

If the SCM.config file is in a network file folder, each client machine must have read/write permissions to the file location where the SCM.config file is stored.

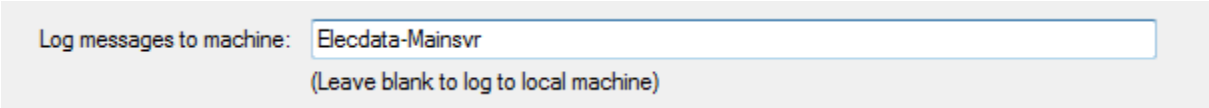


Other configuration settings that are used by both desktop and mobile components are shared in “SentinelGIS.config” files specific to each module. These are saved in the DataLink GIS “Hand-Held Software” directory, under Applets\MobileApps, in sub-folders specific to each directly. Examples include custom site naming settings, mobile device raster/image file settings, zone layer settings, no spray zone layer settings, etc.

Elecdata Logging Service

DataLink GIS and Sentinel GIS log informational, warning, and error messages to a logging database. This SQLce database is called “ElecData Log.sdf.” By default, this database is stored in the DataLink GIS home directory.

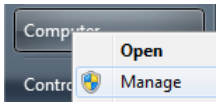
Messages are logged to the database by the Elecdata Logging Service. This service stores messages locally to the "Elecdata Log.sdf" file. If remote logging is configured, those messages are mirrored to a remote machine. Remote logging is configured during DataLink GIS installation, or by going into DataLink GIS Options > File Paths and specifying the machine name or IP address to log messages to.



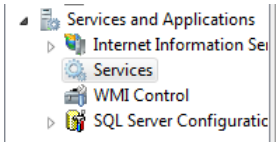
If a remote machine is specified, that machine must have the Elecdata Logging Service installed. The service is installed with DataLink GIS, or can be installed by itself using the DataLink GIS installer.

Please note that if the SCM.config file (which contains the settings for where to log messages) is stored on a network location, the Elecdata Logging Service may not start correctly. This is because by default it uses the "SYSTEM" account, which does not have visibility to network resources. Therefore, it may be necessary to stop the service and change how it authenticates. If this is necessary, perform the following steps:

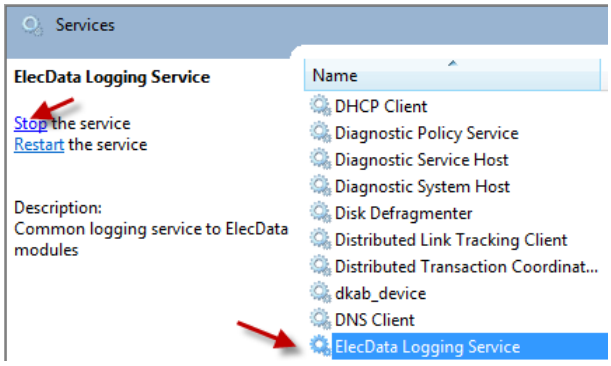
1. In Control Panel, go to Administrative Tools > Computer Management (or right-click My Computer and select Manage).



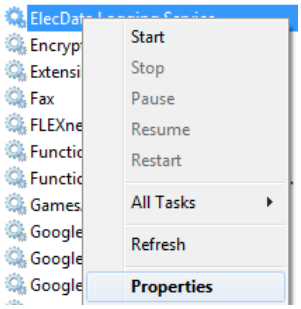
2. Browse to Services and Application and select Services.



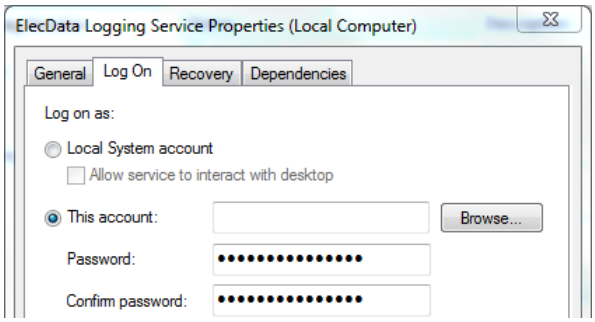
3. Highlight the Elecdata Logging Service and select Stop.

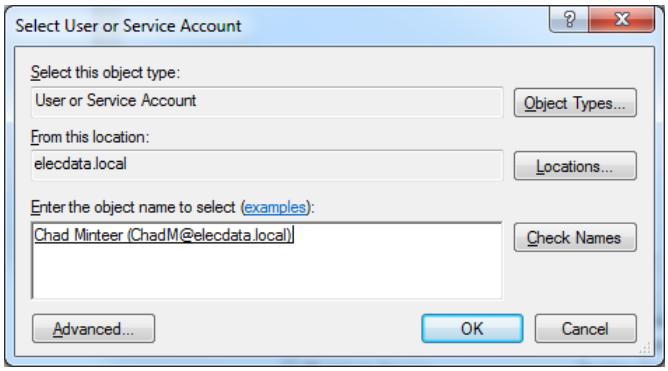


4. Right-click the Elecdata Logging Service and select Properties.



5. Select the Log On tab, and change to "This account." Press Browse, then specify a valid user with permissions to the SCM.config file path.





6. Start the Elecdata Logging Service.

Database Type

Sentinel GIS supports either a file or SDE geodatabase for Larviciding, Adulticiding, and Surveillance. The choice of database type is set during installation of the first Sentinel GIS module. Thereafter, you will not be prompted to select the geodatabase type.

If you should wish to change database types, a couple of XML configuration settings files must be modified. ***Back up the SCM.config file before making manual modifications to it.***

$DATALINK_GIS_MERGEPATH\SCM.config

```
<category name="datasource">
 <options>
  <option name="name" value="SentinelGIS.sde" />
 </options>
</category>
```

Value: SentinelGIS.gdb = file geodatabase
Value: SentinelGIS.sde = SDE geodatabase

Changing the database type will not result in conversion of an existing database. Rather, next time data is extracted or the configuration utility is run by any Sentinel GIS module, a new file geodatabase would be created, or the program will prompt for SDE connection details. ***A SentinelGIS SDE database must be created manually in ArcCatalog prior to connection. Sentinel GIS will not create an SDE geodatabase.*** Once connection details are supplied, Sentinel GIS will create the necessary feature classes, tables, and domains.

$DATALINK_GIS_HOMEPATH\DataLinkMergeMapping.xml

Each reference to OfficeDataSource must point to the correct geodatabase type as well.

```
<DataLinkMergeMapping xmlns="http://tempuri.org/DataLinkMergeMapping.xsd">
        <DataMappings>
                <DataMapping>
                        <!-- Name of the mobile shapefile -->
                        <MobileDataSource>Fogger_Log.shp</MobileDataSource>
                        <!-- Name of the office data source (shapefile, PGDB or SDE connection file -->
                        <OfficeDataSource>SentinelGIS.sde</OfficeDataSource>
                        <OfficeFeatureClassName>Fogger_Log</OfficeFeatureClassName>
                        <CopyToTransmitAfterMerge>False</CopyToTransmitAfterMerge>
                        <BypassStandardMerge>True</BypassStandardMerge>
```

Handheld Settings

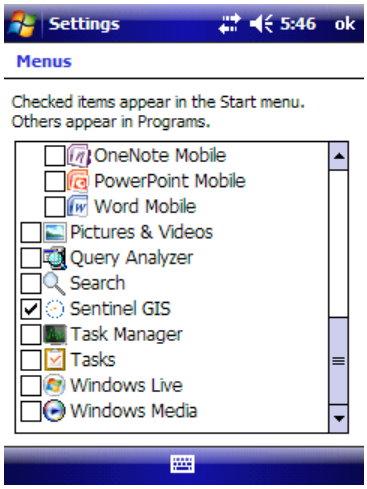
Windows Mobile devices display certain program shortcuts on the Windows Start menu and the Today screen by default. Most of these program shortcuts are unneeded and potentially confusing if field technicians will not be using them.

Power settings also turn the handheld off if it is not used for a certain amount of time. While this can save battery power, it can also cause problems with GPS connections when the device power is turned back on. On some devices, the GPS connection is not restored, which requires ArcPad's GPS connection to be restarted. In some cases, it may cause the ArcPad program to crash.

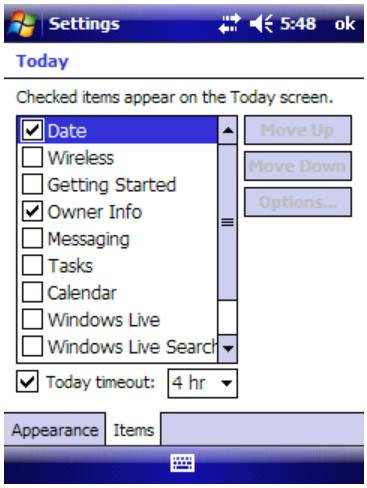
Unneeded items can be removed from the Start menu and the Today screen. Power settings can also be adjusted.

GPS Settings in the Windows Mobile system settings allow Windows to manage NMEA GPS connections. This is useful if the screen is turned off, and the device is resumed, because Windows can reconnect to the GPS receiver.

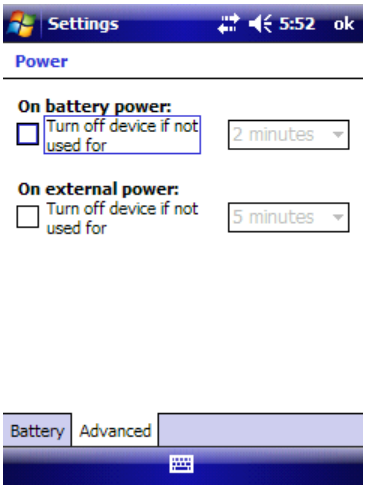
1. On your mobile device, tap Start > Settings. Tap the Menus shortcut. Uncheck the box for all programs that will not be used by field technicians, then press OK.



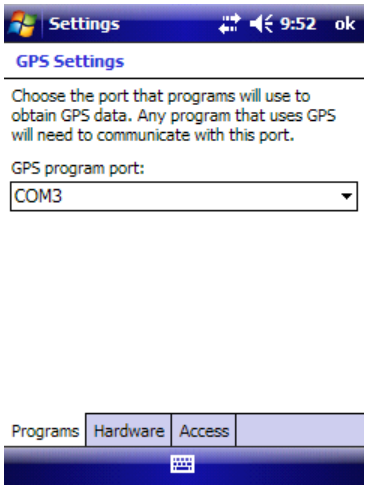
2. In the main Settings windows, tap the Today shortcut, then select the Items tab. Uncheck the box for all programs and items that will not be used by the field technicians, then press OK.



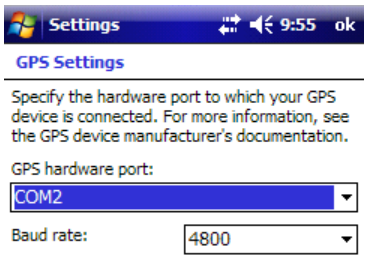
3. In the Settings window, tap the System tab > Power > Advanced tab. Uncheck the box to turn off device if not used for 2 minutes on battery power.



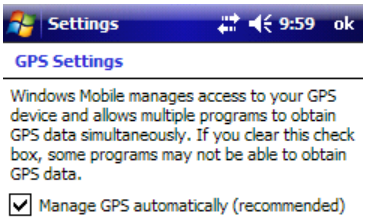
4. In the System tab, tap GPS/External GPS.
5. Set the GPS program port to the port number ArcPad will use to connect to GPS. This port number is your choice, but it must be a port not already in use by the handheld, and it must match the ArcPad Preferences or device setting for GPS program port (see following sections for setting device-specific GPS settings). For a Juniper Archer, Trimble Juno SB/SC, or Nomad, the port can be COM3.



6. Tap the Hardware tab. Set the GPS hardware port to the port the GPS receiver actually connects to (see the section on setting device-specific GPS settings for details on various receiver types and which ports they use). Set the baud rate to that used by the receiver. NMEA standard is 4800, but some receivers can be configured to output different baud rates.



7. Tap the Access tab. Check the box to let Windows manage the connection automatically. ***Windows can only manage NMEA device connections. Other protocols (SiRF, TSIP) are not supported by Windows.***



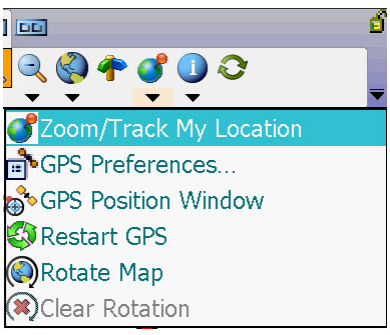
GPS Connection Settings

Each handheld connects to GPS using different COM port settings and sometimes different protocols. ArcPad provides a user interface to configure GPS settings on the handheld, but these are often confusing to non-technical field users. Sentinel GIS manages GPS connection settings, so that when ArcPad starts, GPS is automatically connected. Default settings can be changed on the handheld, but will be reset the next time that Sentinel GIS is started.

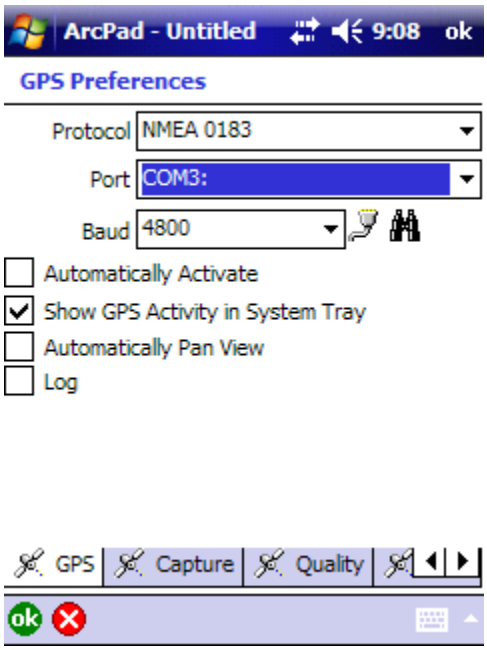
Changing ArcPad GPS Preferences for the Current Field Session

When GPS Preferences are changed on a handheld, these changes are saved to the ArcPadPrefs.apx file in \My Documents, or \My Documents\ArcPad. These changes are discarded when the field user exits ArcPad and restarts a Sentinel module.

1. On the handheld, start Sentinel GIS (any module).
2. Tap the *GPS Position* pull-down then select *GPS Preferences*:



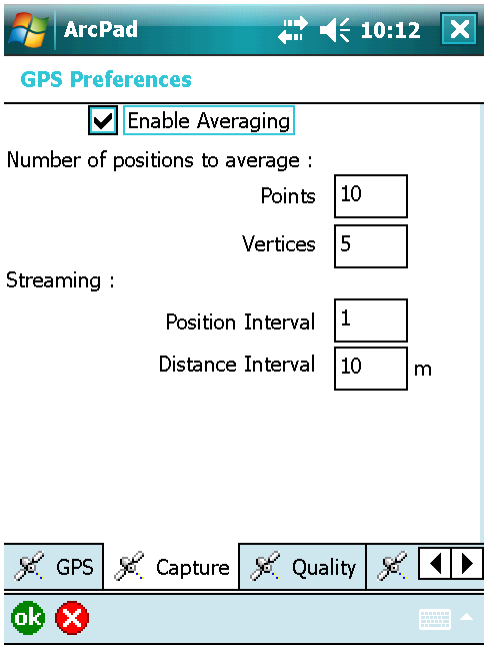
3. Configure preferences. The *GPS Preferences* dialog has seven tabs that are shown at the bottom of the screen. The following pages show the recommended settings, and explain the meaning of additional settings.
   a. ***GPS tab.*** Use the *GPS* tab to configure the GPS communication parameters.



Field	Setting
Protocol	Sentinel GIS sets this to NMEA by default. Don't change this setting.
Port	COM3 by default
Baud	4800 default
Automatically Activate	Not selected by default. Sentinel activates GPS automatically.
Show GPS Activity	When checked, the ArcPad icon displayed in the system tray flashes when GPS is active
Automatically Pan View	Select to automatically pan the map to keep the GPS position centered when GPS is active. The default is unchecked. This allows you to view other parts of the map

	even when GPS is active.
Log	When checked, the raw data output from your GPS receiver is logged to a GPS log file. Not selected by default.

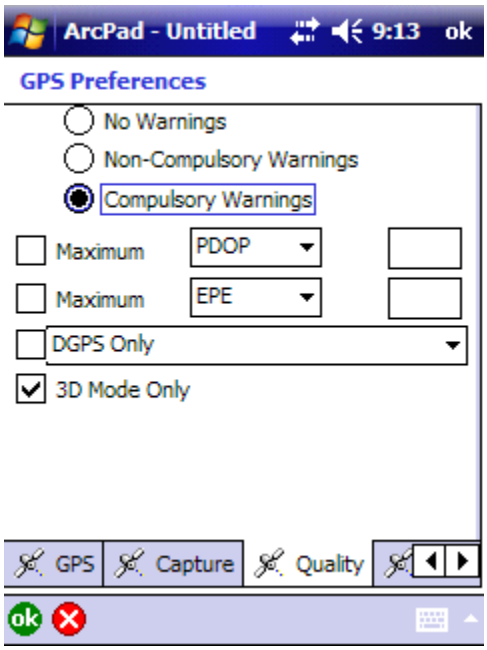
b. ***Capture tab.*** Use the *Capture* tab to specify position averaging and the collection interval for the GPS receiver.



Field	Setting
Enable Averaging	Select to enable averaging for the GPS capture of Points and Vertices. The default is cleared. **RECOMMENDED ON!**
Number of positions to average	**Points.** Enter the number of continuous GPS fixes that you want to average when capturing a point feature with the GPS. Averaging multiple GPS fixes tends to improve the accuracy of the captured point. The number of positions to average will vary by receiver type. The default is 10. **Your agency or company standard may be different. Average more with SiRF receivers.** **Vertices.** Enter the number of continuous GPS fixes that you want to average when capturing a vertex of a polyline or polygon feature with the GPS. The default is 5.
Streaming	**Position Interval.** Enter the capture position interval. Default is 1 second. **Distance Interval.** Enter the capture distance interval you want to use when capturing continuous vertices of a polyline or polygon feature with the GPS. For example, an

	interval of 5 m means that a vertex will be captured only if the distance from the current GPS position to the previously captured vertex is 5 m or more. Specifying a distance interval slightly greater than the accuracy of the GPS will help to eliminate spikes when moving at low speeds or when standing still. The default is 0 (time interval will be used instead of distance).

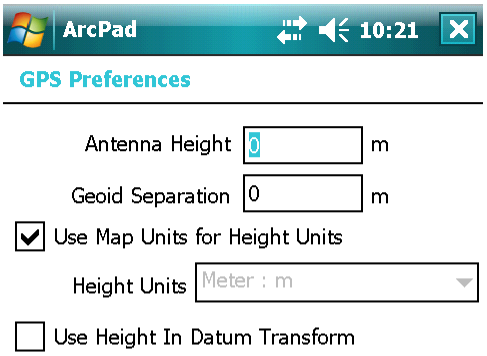
c. ***Quality tab.*** Use the *Quality* tab to specify quality thresholds for the GPS receiver. The thresholds affect GPS data capture and alerts but do not affect the GPS cursor, GPS Position Window, or GPS navigation. *More detailed information can be found in the ArcPad Reference Guide.*

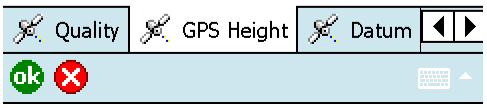


Field	Setting
Warnings	Compulsory Warnings selected by default. If specified conditions are not met, GPS data cannot be recorded. Non-Compulsory Warnings will provide a warning that can be overridden.
Filters	**DOP and Accuracy.** Not configured by default. DOP filters prevent GPS data collection if satellite geometry is poor (visible satellites are not well spread out). EPE (Estimated Positional Accuracy) filters prevent GPS collection if estimated accuracy is not below the specified value. EPE is not supported by all GPS receivers. These filters can improve accuracy, but limit productivity. **DGPS.** Not configured by default. DGPS filters prevent GPS data collection if real-time DGPS correction is not being received (for example, from WAAS satellites). This can improve

	accuracy if GPS data will not be post-processed, but can limit productivity if real-time correction signals are not being received. **3D.** Checked by default. This requires 4 or more satellites for GPS data to be collected. This should not be changed. Data collected with 3 satellites can be very inaccurate.

d. ***GPS Height tab.*** Use the *GPS Height* tab to specify heights and height units that will be used by ArcPad when the software calculates Z-coordinate values. *Not used with 2D layers.*

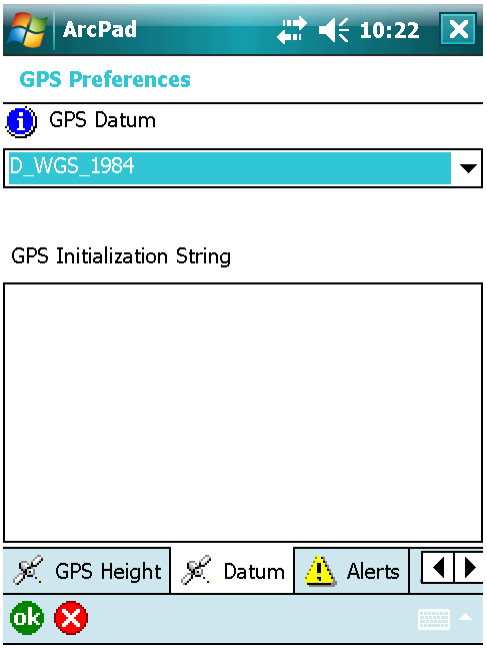




Field	Setting
Antenna Height	Enter the height of the GPS antenna in the specified height units. ArcPad subtracts the antenna height from the ellipsoidal height (HAE) to determine the height for the Z-value. The default is 0.
Geoid Separation	Enter the distance between the geoid and the ellipsoid in the specified height units. ArcPad subtracts the geoid separation from the ellipsoidal height (HAE) to determine the height for the Z-value. The resultant height is the MSL (orthometric) height. The geoid separation is negative where the geoid lies below the ellipsoid. The default is 0. ***Note:*** *GPS Analyst always recalculates Z-values of GIS features from the GPS positions stored in the GPScorrect.ssf file, which are always ellipsoidal (HAE).*
Use Map Units for Height	Select to use the map units as the height units. If the map units are degrees, then the height units will be meters. The *Height Units* field is not available if you select the

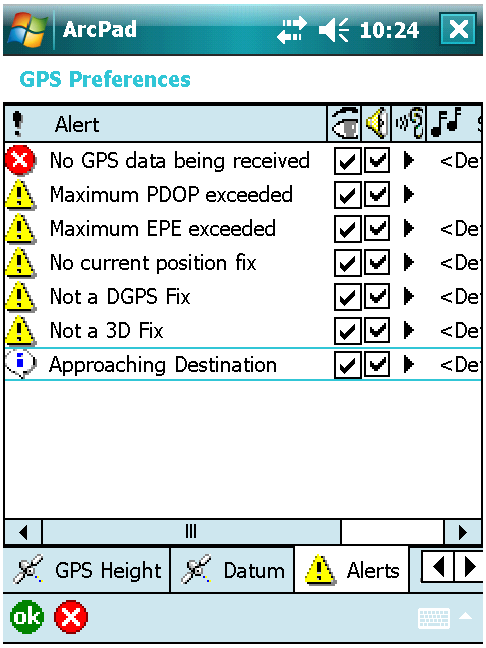
Units	check box. If the check box is cleared, the height units that are used by ArcPad are the units selected in the *Height Units* field. The height units that are selected from the *Height Units* dropdown list will be used in all of ArcPad's calculations and in the display of elevation and Z-values, including the *Elevation* field in the *GPS Position* window. The default is selected, and the *Height Units* field is not available.

e. ***Datum tab.*** Use the *Datum* tab to specify the datum of the incoming GPS positions as well as an optional GPS initialization string.



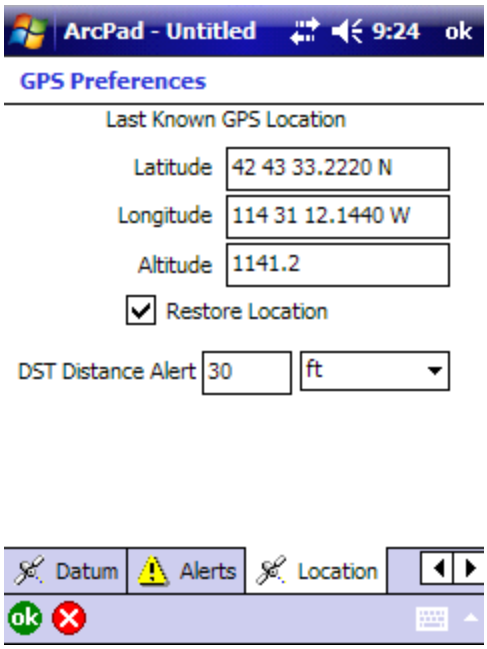
Field	Setting
GPS Datum	Specify the datum of the incoming GPS positions. This does not set the datum on the receiver, nor is it related to the projection of the current map. ArcPad does an on-the-fly projection between the geographic coordinates coming from the GPS receiver and the coordinates used in the current map. If the datum specified here is incorrect, you will get incorrect GPS coordinates in ArcPad. Most GPS receivers use D_WGS_1984 by default, which is the default. ***Do not change the default when you use a Trimble receiver.***
Datum information	Tap the *datum information* button to view the datum transformation parameters that ArcPad will use when transforming coordinates from the GPS datum to the datum of the map (e.g. WGS84 to NAD83).

f. ***Alerts tab.*** Use the *Alerts* tab to configure alerts to notify you about specific GPS quality or navigation conditions that occur when the GPS receiver is communicating with ArcPad. You must configure each alert that you want to be active. Each alert has two components: a message and a user-defined sound.



Field	Setting
Alert	Displays the name of the alert. This is a display-only field.
Message 	Select to activate the alert message. Default is checked.
Sound 	Select to activate the alert sound. Default is checked.
Play 	Tap ▶ to listen to the sound associated with the alert. This is the sound that you will hear when the alert occurs and the alert sound check box is checked.
Sound Name	Tap the link to select the .wav file that will be played when the alert occurs. The default is the default sound that is specified in the *Sounds* tab of the *Sounds & Notifications* dialog in the Windows Mobile software. The Asterisk sound is specified in the *Sounds* tab of the *Sounds and Multimedia Properties* dialog for the Windows operating system.

g. ***Location tab.*** Use the *Location* tab to specify a starting location for the GPS position until a current position fix can be obtained. Also use this tab if you specify a minimum distance from the target location before ArcPad displays an alert when you are using the GPS receiver for navigation.

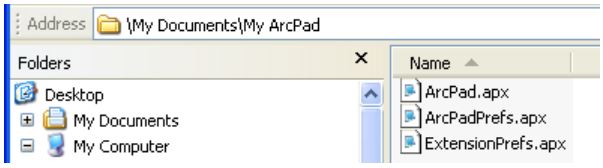


Field	Setting
Latitude	Enter the starting latitude to use for the GPS position until a current position fix can be obtained from the GPS receiver. The default is 0, or the last known location.
Longitude	Enter the starting longitude to use for the GPS position until a current position fix can be obtained from the GPS receiver. The default is 0, or the last known location.
Altitude	Enter the starting altitude to use for the GPS position until a current position fix can be obtained from the GPS receiver. The default is 0, or the last known location.
Restore Location	When selected, the location displayed in the *Latitude, Longitude,* and *Altitude* fields will be used as the initial GPS position, until a current position fix can be obtained from the GPS receiver. This location will also be used to provide the GPS receiver with an initial position, which can help it start tracking satellites more quickly when using the Earthmate or TSIP protocols. The default is checked.
DST Distance Alert	Enter the minimum distance from the target location before displaying an alert when using the GPS receiver for navigation.

Making ArcPad GPS Preferences Changes Permanent for all Handhelds

If changes are made to GPS Preferences on a handheld, as discussed in the previous section, those changes are discarded next time a Sentinel GIS module is started on the handheld. If you would like changes to be permanent (for example, averaging or logging interval settings, alerts, filters), this requires copying the ArcPad Preferences file from the device that the changes were made on to the PC's DataLink GIS 'Hand-Held Software' directory.

1. Make changes to GPS Preferences on a handheld as discussed in the previous section.
2. Connect the handheld to the PC.
3. Start My Computer or File Explorer on the PC.
4. Browse to the Mobile Device. Locate the ArcPadPrefs.apx file in the \My Documents\ or My Documents\ArcPad\ folder.



5. Copy the ArcPadPrefs.apx file.
6. Browse to the DataLink GIS 'Hand-Held Software' directory (typically this is c:\Program Files\DataLink GIS\Hand-Held Software). Browse into Applets\MobileApps\. Paste the ArcPadPrefs.apx file in the folder for each module that you wish the settings to apply to (Larviciding, Adulticiding, Service Request, Surveillance). Overwrite the file that already exists.
7. Connect each handheld and press the Install button in DataLink GIS.

Configuring GPS Connection Settings for Different Mobile Device Types

Your field technicians may use a variety of handheld devices that have different GPS connection settings.

Device	Name	Protocol	COM Port	Baud
Juniper Archer with Compact Flash GPS receiver (GlobalSat, Trimble XC[18])	Archer	NMEA	3[19]	4800
Juniper Archer with Hemisphere XF-101 GPS receiver	Hemisphere	NMEA	3[20]	57600
Juniper Mesa	Mesa	NMEA	7	38400
Trimble Juno SB/SC/3B/3D	Juno_SB_SC	NMEA or SiRF[21]	4	4800 for NMEA, 38400 for SiRF
Trimble Nomad L	Nomad	NMEA or SiRF[22]	2	4800 for NMEA, 38400 for SiRF
Trimble Nomad G	Nomad_G	NMEA or SiRF[23]	2	9600 for NMEA, 38400 for SiRF
Trimble GeoExplorer	Geo_X	NMEA[24]	2	4800
Trimble Yuma or other Windows laptop	Generic	NMEA	2	4800 for NMEA

[18] The Trimble Juno and Nomad receivers use NMEA protocol by default. If Trimble field software is used to connect to the receiver (TerraSync, GPScorrect for ArcPad, GPS Controller), the protocol is automatically switched to SiRF. This will prevent ArcPad and Sentinel GIS from being able to connect to it, unless the receiver's protocol is changed back to NMEA, or the configuration settings for the device are changed to SiRF protocol. For instructions on setting NMEA output, see www.trimble.com/support for Support Notes for a particular device.

[19] Requires configuration of GPS in Windows Settings > System tab, as outlined in the section on 'Handheld Settings.' If Windows is not configured to automatically manage the connection, the COM port is COM2.

[20] See footnote 18.

[21] See footnote 17.

[22] See footnote 17.

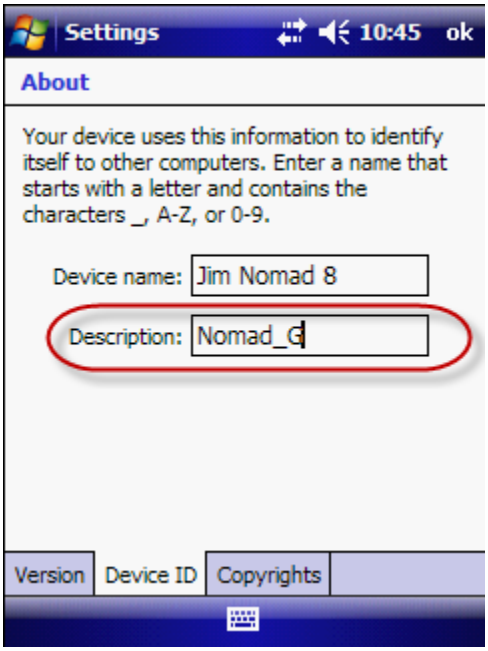
[23] See footnote 17.

[24] The GeoExplorer series always outputs NMEA on COM2 and TSIP on COM3. Trimble field software (TerraSync, GPScorrect for ArcPad, GPS Controller) always uses COM3. Other applications (ArcPad/Sentinel) use COM2.

Trimble ProXT, XH, XRT, or XB	Add to config	NMEA[25]	Bluetooth port, varies	4800

The ArcPad Preferences file only specifies one setting for GPS Protocol, COM port, and baud rate. This would interfere with automatic GPS connection on all devices if they use different settings. However, GPS connection settings will be handled automatically by the Sentinel GIS Mobile Application Manager, if the device ID setting on the handheld is configured correctly.

1. On the handheld, go to Start > Settings > System tab. Tap the About shortcut, then tap the Device ID tab. In the *Description* field, enter the Device Name from the preceding table. Tap OK to save.



2. When Sentinel GIS starts, it will read the Device ID > Description setting, look for a match in the ElecData.Mobile.ApplicationManager.config file, and upon finding a match, it will set the ArcPad GPS preferences appropriately before starting ArcPad. If it does not automatically connect, continue with the following steps.
3. Locate the ElecData.Mobile.ApplicationManager.config file in the DataLink GIS \Hand-Held Software\Program Files\ElecData path. Open it in a text editor like Notepad. Use caution when editing the .config file. If required formatting is missing, the Sentinel application manager will not start and will throw errors.
4. Locate the **<Device Types>** section. Each device type is entered in the following format:

   <DeviceType>

[25] NMEA output over Bluetooth must be configured using Trimble GPS Controller software. See www.trimble.com/support for Support Notes on configuring NMEA output for a particular receiver.

```
        <ID>12</ID>
        <Name>Nomad_G</Name>
        <GPSProtocol>NMEA</GPSProtocol>
        <GPSPort>2</GPSPort>
        <GPSBaud>9600</GPSBaud>
        <AuxPort>1</AuxPort>
        <AuxBaud></AuxBaud>
</DeviceType>
```

The example above is for a Trimble Nomad G. The device name is Nomad_G, and the GPS settings are NMEA, COM2, 9600 baud. The 9-pin COM port (or Auxiliary Port) is COM1. AuxBaud does not have to be configured.

5. If your device is listed, make note of the Device Name.
6. If your device is not listed, insert it above the **</Device Types>** line, in the format shown above. Increment the <ID></ID> tag to the next available number. For example, if the last listed device is ID 15, then enter your new device as <ID>16</ID>.
7. Save any changes that were made to the file, then exit Notepad.
8. Connect each handheld and press Install in DataLink GIS.

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Sentinel® GIS